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The Building of the Body

THE DEVELOPMENT OF HEALTH AND STRENGTH AND
PREVENTION OF DISEASE BY WISELY
SELECTED FOOD

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BY

Albert Broadbent

F.S.S., F.R.H.S.

Author of
"SCIENCE IN THE DAILY MEAL"
"FRUITS, NUTS, AND VEGETABLES AS FOOD AND MEDICINE

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To

Professor W. O. Atwater

In appreciation of his great and beneficent labours
in promoting a better knowledge of dietetics
and for much help received,

This Book is Dedicated

By the Author

1903

THIS book is sent forth with the earnest hope that it may contribute to a better knowledge of the subject of food and dietetics. There is no matter about which the public need guidance so much, as that dealt with herein. The author will feel glad if he has been able to dispel some of the misconceptions which abound on this important subject.

ALBERT BROADBENT
MANCHESTER

January 1st, 1903

But we, brought forth and rear'd in hours
Of change, alarm, surprise—
What shelter to grow ripe is ours?
What leisure to grow wise?

Too fast we live, too much are tried,
Too harass'd, to attain
Wordsworth's sweet calm, or Goethe's wide
And luminous view to gain.

MATTHEW ARNOLD

The mass of us are flouting nature every day, and reaping the consequences. We are hearing just now about the wonders of the open-air cure. Under the modern conditions of industrialism and great cities, we are all of us semi-invalids, and there is only one way of curing us. The British people are suffering from a want of fresh air. We cannot grow decent flowers in the heart of a city, but we think we can grow men. However we may settle the problem, whether by "garden cities" or by the re-adjustment in manufacturing, the present conditions will have to go.

J. B., IN THE *Christian World*

CHAPTER I.

THE BUILDING OF THE BODY

In the elder days of art
Builders wrought with greatest care
Each minute and unseen part—
For the Gods see everywhere.

Build to-day then strong and sure,
With a firm and ample base,
And ascending and secure
Shall to-morrow find its place.

LONGFELLOW.

THIS most suggestive thought, adapted here in its literal sense, brings to our minds the days of restfulness and leisure when men had time to think, it takes us away from the rush and fever of the present day to an atmosphere of calm.

The jerry building so apparent in the architecture of all towns and cities,—the jerry building apparent in the physique of so vast a number of human beings, in city and country,—are both the product of the age in which we live.

Few have time to spare for the study of the laws of health, and few who understand these laws will give time for living up to them. It would seem that men have only time to spare for money-making and ambition. A little observation made in any large city demonstrates how greatly the rushing spirit dominates the average man. He rushes over his meals, rushes for his train, rushes through his business and through his one-sided life to the time when health breaks down, and physiological bankruptcy stares him in the face. It is out of this feverishness, where tranquility is so absent, that the present race is being born, a race apparently predisposed to almost every kind of disease.

The Building of the Body is a matter of vast importance, and it should be demanded of everyone —parents especially, and those who hope to be parents —whose life relations affect the race, that they shall do everything in their power to endow their offspring with health, vigour, and strength. Much might be done by such care to avert the present decadence in the race which is so evident on every hand.

During recent years considerable interest has been manifested in the question of the feeding of animals and human beings. Agriculturalists in the United States have made such progress in the feeding of stock that they are able to determine the amount of *pork* a certain weight of maize will produce. The British agriculturalist is becoming educated in this way. Earl Grey states that the size of cattle and sheep have been nearly doubled during the last century by recording their weights and paying attention to their requirements.

The human animal appears to be the last to receive consideration in the matter of right feeding, though his well-being and physical efficiency is dependent on a thoroughly nourished body. It is gratifying, however, to see signs of awakening public interest in this important subject.

Sir James Crichton Browne is notable among medical men for his consistent endeavour to stimulate public interest in the proper feeding of the nation, especially the section which is under-fed. He states that this question of food is one "of primary importance, far more so than education."

The invaluable work done by Mr. Charles Booth and Mr. Seebohm Rowntree has demonstrated the need for earnest and immediate enquiry into the feeding of the nation, if British supremacy in the commercial world is to be maintained. We have one section of the community considerably over-fed, and nearly 30 per cent of another section receiving 25 per cent less food than is considered necessary by food experts to maintain physical efficiency.[1] Both these extremes are hurtful, the scientifically balanced dietary is the correct thing, and should be sought after. Mr. Rowntree, in his book, most forcibly demonstrates how disastrous under-feeding is to the

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[1] *Poverty: a Study of Town Life.* Lond.: Macmillan, 2/6 and 10/-

Kent.

national well-being. Boys leaving school at 13 years of age, from the ill-fed section, averaged 11 pounds less in weight and 3½ inches less in height than boys of the same age who had been properly fed. The death-rate among children of the ill-fed poor is much higher than among those sufficiently nourished. Of three thousand recruits drawn largely from the ill-fed class, during the South African war, 47½ per cent were classed as bad.

Mr. Arnold White states that of 11,000 men who volunteered at Manchester for service in South Africa only 3,000 were accepted as physically fit, and of these only 1,200 came up to the standard of what a soldier ought to be.

In his presidential address, on the subject of "Physical Efficiency in Children," delivered before the medical section of the International Congress for the welfare and protection of Children, held in London, 15 July, 1902,[1] Sir James Crichton Browne said that "the time has come for an awakening on the subject of physical efficiency. We have begun to realise that the conditions of industrial competition in the world have changed, that we in this country no longer possess the incontestable superiority in skill and productive power we at one time enjoyed. We have begun to perceive that the competing nations around us are becoming commercially transformed

[1] P. S. King & Son, Orchard House, Westminster. 2/6.

and are encroaching on our markets more and more, and we have begun to discover with consternation that we are losing not only our geographical advantages but to some extent the stamina of our people. The diminished death-rate upon which we have been wont to pride ourselves is but a sorry comforter if the population we are keeping alive is increasingly sickly and debilitated. The sum total of our physical shortcomings must be a figure that it would be woeful to contemplate—the mentally defective, deformed, scrofulous, purblind, knock-kneed, flat-footed, narrow-chested."

WEIGHING AND MEASURING.

In this remarkably sympathetic and able address Sir James urges the adoption of school registers where the weights and measurement of height of school-children could be regularly entered; he also recommends that similar family registers should be adopted. The use of such registers would be of the utmost value in indicating physical condition.

But the average man only laughs if advised to take such precautions as these. Speaking at a public meeting recently I strongly urged that the food required daily should be weighed, in order that proper nourishment might be maintained. I also mentioned that Dr. Alexander Haig insisted on his patients weighing their food, as he found so many who came to him were under-fed. My remarks were published in several London and provincial newspapers, and in every case *the matter was treated with ridicule.* This attitude on the part of the public and the press makes one despair of making headway in reforming the present hap-hazard manner of feeding in vogue. It is difficult to see why it should seem so ridiculous to weigh food. It is not meant that food should always be weighed, but that scales should be used until everyone can tell at a glance how much one or two ounces of cheese, two or four ounces of bread, biscuit or other food represents in bulk. The gain to health and power of endurance would be quickly manifest were such a practice adopted.

That there is urgent need for the dissemination of information on these points none will deny. There is no subject about which there is so much conflict of opinion, as on this subject of food. The student of health is bewildered by the diversity of the statements and the teachings of the various schools of health. His study in these academies is usually a procession from one to another; he finds that many of the plausible theories advanced are either a weariness to the flesh or unsuited to the demands of every-day life. He succeeds eventually in sifting from the mass of thought he has reviewed, a system and a plan that meets the demands of his daily needs, realising that simplicity and common-sense are the essential factors in the building of a healthy body.

Much of the want of vigour and ill-health that many suffer from is due to defective nutrition caused by want of sufficient food. Everywhere I go I find food reformers insufficiently fed. They are afraid to eat sufficient food.

TOO LITTLE FOOD.

I have lectured all over the United Kingdom, and the common expression I hear is:—"Everyone eats too much," and so the food reformer goes to the opposite extreme and reduces his food to the bare subsistence point. It is really wonderful how much success can be achieved in diminishing the food supply, but where this is done there is always an absence of vigorous working power.

In building the body the aim should not be how little carbohydrates or how little proteid can be lived upon, but to supply daily sufficient of these compounds to maintain the physiological demands.

It is now abundantly proved that the poorest work is done by the person who is ill-fed. The death-rate is highest, disease is more rampant, more drinking and crime exist where the food used is insufficient and of poor quality.

Behind every function of the body is what I would call the controlling power of *nerve strength.* Muscles, circulation, digestion, assimilation, brain power, all depend for their vigour and strength on strong nerves, and *strong nerves* depend on a sufficient supply of proteid and upon a rightly balanced dietary. Nervous people are always ill-nourished.

Physiological experiments have been made in recent years, which demonstrate that the nerves are nourished by proteid. I have repeatedly proved this to be true.

BALANCE IN THE DIET.

Professor Atwater of the U. S. Department of Agriculture, writing in the Year Book for 1901, on Dietaries in Public Institutions, states that, "in efforts towards the improvement of dietaries, especially in large institutions, the following principles are to be considered: (1) A certain amount of food is necessary for the maintenance of the body. (2) This food requirement differs with different conditions of age, sex, health, muscular activity, environment, etc., and is termed the physiological demand. (3) Dietary standards expressing the physiological demands are measured not in quantities of food materials as meat, bread, potatoes, and the like, but in quantities of nutrients and energy. (4) It is practically impossible to store, cook, and serve food without more or less shrinkage and waste, the quantity of food lost in these two ways depending upon its quality and upon the methods of storeroom, kitchen and dining-room management. (5) To meet the needs of an institution the food supply must be enough to cover not only the physiological need of its population, but also the actual shrinkage and waste. (6) If more food than necessary is supplied, the kitchen and table wastes are likely to be increased, and there will also be a tendency for the inmates of the institution to consume more food than is required to maintain them in health, thus entailing still further loss, to say nothing of the unnecessary tax upon the digestive system and the consequent injury to health; on the other hand, if the food supply is limited and the shrinkage and waste are large, the inmates may be under-fed. (7) Pecuniary economy requires not only that there shall be a minimum of shrinkage and waste, but that the food shall be such as to furnish the needed nutriment at the lowest cost. (8) Hygienic economy requires not only that the food shall meet the physiological demands in respect to the quantities of nutriment and energy, but also that it shall be fitted to the digestive powers and other physiological peculiarities of the users: this is of special importance for invalids and young children. (9) The comfort and welfare of the users are promoted by making the food palatable and attractive."

Professor Atwater states further that "It is often assumed that the appetite may be taken as a measure of food requirement, but in many cases it is a very unreliable criterion.

"Excessive eating is not only a waste of food, and, therefore, of money, but it is injurious to health.

"Physicians and hygienists are very generally of opinion that a large proportion of the well-to-do people in this country eat more than is necessary, and this opinion is certainly borne out by figures for actual food consumption. On the other hand, there are many people, who, from lack of food or appetite, or for other reasons, do not eat as much as would be best for them."

We thus see that the statement commonly made that appetite is the best guide in regulating bodily food supply, is misleading.

Professor Atwater writes on this subject as the man of science, and his statements are invariably supported by the result of his researches and experiments.

EDUCATION OF MOTHERS.

For several years now I have been urging that *balance* in the diet should be sought after in building the body. As I have had opportunity I have urged that mothers and housewives should be educated in all matters relating to food. I was glad to see in the transactions of the Sanitary Congress of 1902 a very able paper by Mrs. L. Hodgkinson, of Chichester, on "Food and Morals." She said among other things: "Until late years, little thought has been given to the constituents of the food we eat, upon which not only our health, but the forces of the brain, and even very high moral questions, depend. The matter has been left in the hands of servants and of the women of a household, who certainly had no opportunity (if they had the wish) of becoming acquainted with the chemical and biological facts involved. In other words, the foundation of the health and well-being of the nation has been left to wholly uninstructed persons who had no further object in view than to cater for the equally uninstructed likes and dislikes of their families and dependents. Likings of this kind offer no criterion whatever of real ultimate advantage to the interests of the individual, since it is a commonplace that taste can be depraved or educated entirely as a matter of habit, and in almost any direction. And the women to whom this important division of labour has been virtually relinquished, have accepted naturally, without thought or question, customs which were formed in the ages of complete ignorance as to the requirements and structure of the human body. Her guide is the rule of thumb, thriftily or unthriftily practised according to her own personality, and she is as innocent of the knowledge of any certain principles which can and ought to be applied as she is of the theory of Chinese music.

"Surely then, in the Ideal Commonwealth, it would not be too much to demand as a beginning that girls should be trained in a knowledge of food values, and the action (stimulating or the reverse) of many foods and drinks in daily use upon the nervous centres? If the physique of a nation is of moment to its rulers, and if the physical impulses which make for or against temptation concern its spiritual teachers, the question of what we eat and drink will not seem too trivial for grave thought. But what is small, and what is great? We cannot tell.

"As this training is almost entirely in the hands of uninstructed women during those years when the disposition is 'wax to receive, and marble to retain,' the whole subject seems worthy of earnest consideration by all who have the national welfare at heart."

ILL-BALANCED FOOD.

Mr. Seebohm Rowntree, in his book, "Poverty," gives a number of menus which are remarkably ill-balanced. A specimen of one family where the income was 20/- weekly, during three days consisted of bread, butter, bacon, tea, coffee, potatoes (once), pudding (once), shortcake (once), kippers (once). Of ten meals, five consisted of bread and butter only; two, bacon and bread. Tea was taken at nine meals; coffee at one meal.

If flesh food is eaten, the most inferior parts only are available, such as liver and other glandular organs, the most poisonous of the flesh foods.

When it is remembered that nearly 30 per cent (*i.e.* 10,000,000) of the population of the United Kingdom are being fed in this way, the matter is grievous to contemplate. It is not to be wondered that disease and death carry so many off in the ill-fed section.

While we have the ill-balanced diet of the under-fed poor, we have also the ill-balanced diet of the wrongly-fed rich. No better example of this bad feeding could be supplied than is provided by our public schools—Eton, for example. At this school flesh foods are supplied at three meals at least during the day, and nowhere can be seen such white anæmic looking boys. I walked through Eton on a Sunday morning in October, 1902, and met the Eton boys trooping out from their rooms and on their way to church; almost without exception every boy had his hands deep in his pockets, and walked with chest drawn in. I passed the church returning from my walk, and once again remarked the absence of that fine erect carriage which is notable about most provincial school boys. As a contrast, the Scotch school boy is always good to look at: his breakfast is usually porridge, chiefly, and a piece of bread is all the food he takes until the evening meal, and he is remarkable for the rude health he manifests.

I do not see how a young boy can grow up pure minded when he is so badly fed as many public school boys are. It is well known that flesh is a

meat + anaemia. oatmeal + health,

powerful stimulant, and the harm it must work when eaten by young boys in too large a quantity must be considerable. The over-supply of the proteid of flesh becomes assimilated, and must produce irritation to the nerve centres, and be a direct cause of impurity.

When will parents give thought to this important matter, and see that their boys in this direction at any rate, have the fullest opportunity to develop naturally, and to enjoy freedom from impure thoughts.

CHAPTER II.

PHYSIOLOGICAL DEMANDS

A WELL-BALANCED diet is one in which the various food compounds needed by the body are properly supplied.

Food chemists tell us that the chemical substances of the body and food are very similar. These substances consist of from fifteen to twenty elements, among which are oxygen, hydrogen, carbon, nitrogen, calcium, phosphorous, and sulphur. These elements are so combined in the food and in the body as to form a great variety of compounds. The most important compounds of the body and foods are:—proteid, fats, carbohydrates, mineral matter, and water. The functions of these compounds, briefly, are as follows:—

Proteid . . . . **forms tissue,** e.g., white of eggs, casein of milk, lean meat, gluten, etc.		All serve as fuel to yield energy in forms of heat and muscular energy.
Fats . . . . **are stored as fat,** e.g., fat of meat, butter, vegetable oils, etc.		
Carbohydrates . are transformed into fat.		

Mineral Matters (Ash)—share in forming bone, and assist in digestion.
e.g., phosphates of lime, potash, soda, etc.

Foods contain these compounds in varying amounts as I shall show in a later article.

Every thought, every feeling, every movement creates demand for these compounds of food, and blood and brain, nerve and muscle, tendon and sinew, are rebuilt from them. There is no excuse for any lacking knowledge of the food requirements of the human body.

The analyses of foods in the food tables at the end of this book are of American food materials, and are those supplied by Professor Atwater, of the U. S. Dept. of Agriculture, whose authority will not be questioned; his splendid work and fame in the department of food analysis is world-wide. Professor Atwater states that "the methods of chemical analysis of foods are now so nearly uniform throughout the world that the analyses reported from different countries furnish a reliable means of comparing the composition of the food products of different parts of the world."

DIETARY STANDARDS AND FOOD TABLES.

Professor Atwater's dietary standards are recognised and quoted by most British physiologists. He states that investigation and experiment has shown that the daily requirements of a—

	Proteid.		Energy or Fuel Value.
	Grams.	Grains.	Calories.
Man at hard muscular work . .	150	2400	4350
Man at mod. active muscular work	125	2000	3400
Man with light muscular work . .	112	1792	3050
Man with sedentary work . . .	100	1600	2700
Man with very little exercise . .	90	1440[1]	2450

There are 16 grains in one gram. 28½ grams in 1 oz.
One Calorie will raise 16 ozs. water 4° F.

Professor Atwater states that woman at moderately active work, boy 13-14, and girl 15-16 years old, require 0·8 of the food of a man at moderately active work. Woman at light work, a boy 12 years of age, and a girl 13-14, require 0·7 of the food of a man.

Boy . .	10–11	requires	0·6	of the food	of a man.
Girl . .	10–12				
Child . .	6–9	,,	0·5	,,	,,
Child . .	2–5	,,	0·4	,,	,,
Child . .	2	,,	0·3	,,	,,

In all institutions where the inmates are fed by these standards, much waste often exists, owing to the massing of large and small men and women.

In my judgment, the formula provided by Dr. Alexander Haig, for determining daily requirements of proteid, is more useful, as it obviates waste. He takes the allowance given in works on physiology of 3·5 grains of urea per pound of body weight per day, multiplies the body weight by 3 × 3 for light employment, and by 3½ × 3 for active employment, e.g., thus:—

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[1] Grains table by Albert Broadbent.

$$\begin{array}{r} 140 \\ 3{\cdot}5 \\ \hline 420 \\ 70 \\ \hline 490 \\ 3 \\ \hline 1470 \text{ grains proteid} \end{array}$$

or 92 grams of proteid daily for a man weighing 140 lbs., and following active employment; for active and hard work more proteid is allowed; Dr. Haig gives his method of calculation "as a rough guide; as appetite on the one hand, and nutrition, strength and power of endurance on the other, are the most certain indications of the necessary quantity and quality."

I have compiled from Dr. Haig's formula, the following table, which indicates the amount of proteid and energy required in one day:—

Stones.	Pounds.	Light Employment Calories.	Light Employment Grains Pro.	Active Employment Grains Pro.	Hard Muscular Employment Grains Pro.
8	112	*1700	1008	1176	1376
9	126	1920	1134	1323	1523
10	140	2140	1260	1470	1670
11	154	2350	1386	1617	1817
12	168	2570	1512	1764	1964

*This table of calories is meant for light employment. As the food is increased, the calories are increased also.

The term calorie is commonly used to represent the energy value of food, thus, one calorie will raise one pound of water 4° F. When more food is consumed, the energy value is, of course, increased :—

One pound of proteid	contains	1820	calories	fuel value.
One gram of proteid	,,	4	,,	,,
One pound of fat	,,	4040	,,	,,
One gram of fat	,,	8·9	,,	,,
One pound carbohydrates	,,	1820	,,	,,
One gram carbohydrates	,,	4	,,	,,

Professor Atwater working in America, and Dr. Lahmann and others in Germany, have shewn us that the mineral matters in food assist in digestion and in promoting metabolism.

I have searched in vain in the works of physiologists and writers on agricultural chemistry for analyses of the ash of plants. For the invaluable tables of the composition of mineral matters, or food salts, we are indebted to Professor Wolff, a German chemist. This table is taken from Dr. Lahmann's "Natural Hygiene."

We have now, I think, scientific material before us to enable us to compile dietaries in which the various food compounds are correctly balanced. I have explained the functions of the food compounds at page 15, and have supplied the dietary standards of Professor Atwater and Dr. Haig. With these standards and the tables of analyses placed at

Mineral matter or food
salts in plants.

DIETARY NO. 1.—URIC ACID FREE.

FIRST MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*	Elderly.
	Tomatoes on Toast.						
41	Bread	5	5	6	7	8	Same as 8st., adding 1 oz. bread.
95	Grated Almonds, or One egg (100 grains).	1	1	1	1	1	
	SECOND MEAL.						
	Creamed Macaroni.						
58	Macaroni	2	2½	2½	2½	3	
9	Potatoes	4	6	6	8	8	
125	Grated Cheese	1	1	1½	1½	2	
4	One apple, 4 ozs.						
4	One banana, 2 ozs.						
30	Small piece fruit pie	3	3	3	3	3	
	THIRD MEAL.						
4	Salad, 6 ozs.						
41	Bread	5	6	7	8	8	
81	Grated Walnuts	1	1	1	1	1	
22	Cake	2	2	3	3	3	
For active life add:							
	Second meal, Cheese	¼	¼	½	¾	¾	
	Third meal, one large cup hot milk (130 grains proteid.)						

TOMATOES ON TOAST.—Take two tomatoes, size as desired, dip in boiling water, peel them. Then place in an earthenware dish, with salt and pepper, and stew or bake until soft. Serve on plain dry toast.

CREAMED MACARONI with CHEESE SAUCE.—Take the cheese, grated, half an ounce of butter, a tablespoonful of milk, a teaspoonful of flour, quarter of a teaspoonful of salt, a little mustard and pepper, a saltspoonful of bicarbonate of potash. Melt butter and mix in flour and seasoning, add cold milk gradually and stir until it boils, then add the cheese, and just before serving, the potash.

The menus and the recipes supplied are most simple, and have been selected and compiled because of their simplicity. The simpler the food combinations in cookery are, the better it must be for digestion.

Dietaries 1 to 12 are uric acid free; that is, they do not introduce that substance or its equivalent into the body by the food.

Dietaries 7, 8, and 9 will be specially useful in blood derangements and skin troubles.

Dietaries 10, 11, 12, are recommended for dyspepsia, but are not meant to be suited to every phase of this disease.

Dietaries 13, 14, 15, are for those conditions where it is difficult to obtain cooked food.

The remaining dietaries contain fish and flesh foods.

In cases where gravy or sauce is preferred with the food, the following are two very useful recipes :—

BROWN GRAVY.—Melt an ounce of butter in a saucepan, stir into it a dessertspoonful of flour until the mixture browns. Add seasoning, pour on boiling water or potato water until the proper thickness is obtained ; boil a minute or two and it is ready.

BROWN GRAVY, NO. 2.—Cut up finely an onion, bruise a tomato, dredge or sprinkle over a tablespoonful of flour, and fry until nicely browned in about two ounces butter. Strain if desired, add boiling water until the desired thickness is obtained, add seasoning, boil a minute and it is ready.

DIETARY NO. 3.—URIC ACID FREE.

FIRST MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*	Elderly.
41	Bread and Butter	5	5	6	7	8	Same as 8st., adding 1 oz. bread.
4	Two roast apples, with cream.						

SECOND MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*
	Macaroni and Cheese.					
128	Cheese (Am'ric'n)	1	1½	1½	1½	2
58	Macaroni	1½	2	2	3	3
9	Potatoes	4	6	6	6	6
	Rice Pudding.					
36	Rice	1	1	1	1	1
	One cup Milk (130 grains).					

THIRD MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*
41	Bread	5	5	7	7	8
95	Almonds grated	1½	1½	1½	1½	2
	With Salad, 6 to 8 ozs.					
22	Plain Cake	2	2	3	3	3

For active life add: first meal, one cup hot milk.

	8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*
Second meal, cheese	¼	¼	½	¾	¾

MACARONI AND CHEESE.—Boil the macaroni three-quarters of an hour; drain it, butter a dish, place alternate layers of the macaroni and thinly-sliced or grated cheese, then a few pieces of butter and some bread crumbs on the top, add seasoning and bake until nicely browned.

RICE PUDDING.—Make in the ordinary way. If the rice is first cooked in water, the milk added and the dish returned to the oven for about twenty minutes, the pudding will be more easily digested. Cooking milk for hours hardens the proteid.

BARLEY PUDDING.—Same method as rice pudding, but simmering the barley in water for some hours before adding milk.

DIETARY No. 4.—URIC ACID FREE.

FIRST MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*	Elderly.
	Plain Haggis.						
72 ...	Oatmeal	1	1	1½	1½	1½	Same as 8st., adding 1 oz. bread.
	½ Cup Milk (65 grains).						
41 ...	Bread and Butter ..	5	5	6	7	8	
	SECOND MEAL.						
	Tomato Omelette.						
41 ...	Bread Crumbs ...	2	3	3	3	3	
	½ Cup Milk (65 grains).						
9 ...	Potatoes	5	6	6	6	8	
	Bachelor's Pudding.						
41 ...	Bread Crumbs ...	2	3	3	3	3	
	½ Cup Milk (65 grains).						
	THIRD MEAL.						
41 ...	Bread and Butter ...	5	6	7	8	9	
68 ...	Hazels, grated ...	2	2	2	3	3	
4 ...	Prunes, stewed ...	2	2	2	2	2	
For active life add:							
	First meal, Bread	1	1	2	3	3	
	Third meal, 1 cup hot Milk.						

PLAIN HAGGIS.—Place the oatmeal in a saucepan with half its weight of butter or good oil, stir until browned a little, then add seasoning and half a teacupful boiling water, boil a few minutes and serve. Add more boiling water if desired.

TOMATO OMELETTE.—Take the bread crumbs, a little chopped onion, seasoning, half an ounce butter, two tomatoes peeled and sliced. Add milk and mix well, bake in a buttered dish until browned.

BACHELOR'S PUDDING.—Take the bread crumbs, one ounce sultanas, three-quarter ounce sugar, a little grated lemon rind, mix with the milk, and steam in a buttered basin three hours.

DIETARY NO. 5.—URIC ACID FREE, UNCOOKED.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*	Elderly.
	FIRST MEAL.						
	Omelette.						Same as 8st., adding 1 oz. bread.
	One Egg (100 grains).						
41 ...	Bread and Butter...	4	5	5	7	7	
	½ Cup Milk (65 grains).						
	SECOND MEAL.						
	Salad, with one Egg (100 grains).						
41 ...	Bread	4	5	6	7	8	
30 ...	Piece Apple Pie ...	3	3	3	3	4	
	THIRD MEAL.						
41 ...	Bread and Butter...	4	5	6	6	8	
100 ...	Cheese Straws ...	2	2	2	2	2	
	½ Cup Milk (65 grains).						
For active life add:							
	First meal, one Egg.						
	Second meal, Bread	1	1	1	1	1	
	Third meal, Bread	1	1	1	1	1	

Boil, fry or poach the egg, or make into an omelette as follows:—

PLAIN OMELETTE.—Beat up thoroughly and add a tablespoonful milk and a dessertspoonful bread crumbs, add pepper and salt, also herbs if desired, pour into omelette pan and fry in butter or good oil.

CHEESE STRAWS.—Mix together two ounces of grated Parmesan cheese (or plain cheese), one ounce of butter, two ounces of flour, and half a saltspoonful of cayenne pepper. Knead into a stiff paste and roll out to about a quarter of an inch thick. Cut the paste in narrow strips about four inches long, twist them, and lay them on a greased baking sheet. Bake for about ten minutes in a moderate oven.

DIETARY No 6.—URIC ACID FREE.

FIRST MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*	Elderly.
	Celery on Toast.						Same as 8st., adding 1 oz. bread.
41 ...	Bread	5	6	7	8	8	
	One Egg (100 grains).						

SECOND MEAL.

	Tomato Rice.					
36 ...	Rice	2	2½	2½	2½	3
9 ...	Potatoes	4	6	6	7	8
125 ...	Cheese	1	1½	2	2	2
	Ginger Pudding.					
41 ...	Bread Crumbs ...	3	3	3	3	3

THIRD MEAL.

4 ...	Salad, 6 to 8 ozs. (with 1 Egg, 100 grains).					
41 ...	Bread	5	6	7	7	8
22 ...	Cake	2	2	3	4	4

For active life add: first meal, 1 cup hot Milk.

Second Meal, Cheese	¼	¼	½	¾	¾

CELERY ON TOAST.—Take nice celery, cut into small pieces, cook in sufficient water, so that scarcely any remains when it is tender, then cover with cream or new milk. Add seasoning, heat up, and pour over toast.

TOMATO RICE.—A breakfast-cupful plain boiled rice, add a teacupful plain boiled tomatoes, mix together, return to pan, heat, and serve with the cheese grated.

GINGER PUDDING.—Take three ounces bread crumbs, an ounce of treacle warmed and melted, one ounce of butter, creamed, quarter teaspoonful ground ginger; mix with milk, and steam one and a half to two hours.

THIRD MEAL.—Boil egg hard and slice for salad.

DIETARY NO. 7.—SKIN AILMENTS.

FIRST MEAL.

Grains Protein per oz.		8st. ozs.	9st. ozs.	10st. ozs.	11st. ozs.	12st. ozs.	Elderly.
4 ...	Salad of Cresses, 6 ozs.						Same as 8st., adding 1 oz. bread.
	½ Cup Milk (65 grains).						
41 ...	Bread	4	5	6	7	8	
	One Egg (100 grains).						

SECOND MEAL.

Grains Protein per oz.		8st. ozs.	9st. ozs.	10st. ozs.	11st. ozs.	12st. ozs.
	Cauliflower, steamed (30 grains), with					
120 ...	Cheese (sauce) ...	1	1	1	1	1¼
	Potatoes	4	5	6	7	8
	Barley and Apple Pudding.					
36 ...	Barley, pearled...	1	2	2	2	2
	1 Cup Milk.					
	Apples, 1 or 2 (30 grains).					

THIRD MEAL.

Grains Protein per oz.		8st. ozs.	9st. ozs.	10st. ozs.	11st. ozs.	12st. ozs.
41 ...	Bread	4	5	6	7	8
4 ...	Salad, Celery 6 ozs.					
100 ...	Cheese Biscuits ...	2	2	2	2	3
For active life add:						
	First meal, bread	1	1	1	1	1
	Second meal, Cheese	¾	¾	1	1	1
	Third Meal, Bread	1	1	1	1	1

CHEESE SAUCE.—*See page 22, Dietary No. 1.*

BARLEY AND APPLE PUDDING.—Wash the barley. Soak overnight, cook in a saucepan two hours, pour into a buttered pie-dish, add one or two sliced apples, sugar to taste, and grated lemon rind. Bake an hour.

CELERY SALAD.—Cut the tender parts of celery into small shreds. Rub the salad bowl with shalot; put in the celery, garnish with steamed cold potato sliced, serve with a dressing.

DIETARY NO. 8.—SKIN AILMENTS.

FIRST MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*	Elderly.
	Cauliflower Salad (30 grains).						Same as 8st., adding 1 oz. bread.
	One Egg (100 grains).						
	½ Cup Milk (65 grains).						
41	Bread	4	5	6	7	9	

SECOND MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*
	Baked Rolls.					
41	Bread Crumbs	2	2	3	3	3
	One Egg (100 grains).					
9	Potatoes	4	6	6	7	8
	Fig Pudding.					
41	Bread Crumbs	3	3	3	3	3
18	Figs	2	2	2	2	2
	½ Cup Milk (65 grains).					

THIRD MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*
4	Salad, Cabbage, 6 ozs.					
41	Bread and Butter	4	5	7	8	9
	½ Cup Hot Milk (65 grains).					
	For active life add:					
	First meal, Bread	1	1	1	1	1
	Third meal, Cheese	0¾	0¾	1	1¼	1¼

CAULIFLOWER SALAD.—Boil or steam a cauliflower, and put it into cold water. When cold, break it into pieces and dry on a napkin. Add two shalots and parsley finely chopped. Place in a salad bowl and pour dressing over.

BAKED ROLLS.—One breakfast-cupful brown bread-crumbs, one egg, parsley, a little butter. Chop the parsley, rub butter into the crumbs, break egg in, and mix stiff enough to form into rolls. Season as desired. Bake in buttered dish.

FIG PUDDING.—Mince the figs; add the bread crumbs, three-quarters of an ounce sugar, and an ounce of butter, creamed; mix with milk; steam one and a half to two hours.

CABBAGE SALAD.—Shred *finely* the tender part of a white cabbage, place in a salad bowl with sliced tomato, and steamed potato sliced. Serve with a dressing.

DIETARY NO. 9.—SKIN AILMENTS.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*	Elderly.
	FIRST MEAL.						
4	Watercress Salad, 6 ozs.						Same as 8st., adding 1 oz. bread.
	One Egg (100 grains).						
41	Bread	4	5	7	8	9	
	SECOND MEAL.						
	Lancashire Potatoes and Plasmon Sauce.						
9	Potatoes	8	8	8	8	8	
360	Plasmon	½	½	½	½	½	
	Rice Pudding.						
36	Rice	1	1	1	1	1	
	1 Cup Milk (130 grains).						
	THIRD MEAL.						
4	Salad, Italian, 6 ozs.						
41	Bread	4	5	6	7	8	
125	Cheese, grated	1	1½	1½	1½	2	
	For active life add: first meal, 1 cup hot Milk.						
	Third meal, Cheese	¼	¼	½	¾	¾	

WATERCRESS SALAD.—Wash three or four bunches of watercress and drain. Slice a cold steamed potato and egg hard boiled. Mix and place in a bowl. Pour dressing over.

PLASMON SAUCE.—Melt half an ounce of butter in a saucepan, stir in a teaspoonful of flour until the mixture browns, add seasoning, and pour over one small teacupful of boiling dissolved Plasmon, boil and stir a minute and it is ready.

LANCASHIRE POTATOES.—Cut up the potatoes and a small onion, place at the bottom of a pie-dish, then a layer of potatoes, then a dessertspoonful of tapioca steeped and sprinkled over. Add the remaining potatoes, placing one ounce of butter in pieces on the top. Add seasoning and fill three parts full of boiling water and bake in the oven.

ITALIAN SALAD.—After cooking one carrot and one turnip in soup, slice them. When cold, mix with two steamed potatoes and one beetroot, also sliced. Add a very little onion, and pour dressing over.

DIETARY NO. 10.—DYSPEPSIA.

FIRST MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*	Elderly.
41	Bread, toasted crisp	5	6	7	8	9	Same as 8st., adding 1 oz. bread.
4	2 Roasted Apples.						
	½ Cup Milk with Water (65 grains).						

SECOND MEAL.

	Italian Rice.					
	One Egg, minced (100 grains).					
36	Rice	2	2	2	2	2
9	Potatoes	4	5	6	6	8
41	Bread, toasted crisp	2	4	4	4	5

THIRD MEAL.

41	Bread, toasted crisp	5	6	7	8	9
100	Cheese Straws	2	2	2	2	2
	½ Cup Milk (65 grains).					

For active life add:

Second meal, Bread	1	1	1	1	1
Third meal, Bread	1	1	1	1	1
Third meal, Cheese Straws	1	1	1	1	1

ITALIAN RICE.—Cut up very finely a small onion, fry in one ounce of butter to a delicate brown—not burned. Put it into a saucepan with two ounces of rice and half a pint of stock or water, add seasoning, cook thirty-five minutes and serve with a hard boiled egg minced.

CHEESE STRAWS.—*See No. 5 Dietary.*

[illegible]

THIRD MEAL

[illegible] Bread, [illegible]

[illegible] Semolina, [illegible]

[illegible] Stewed Prunes

[illegible] to add [illegible] meal [illegible] hot milk.

[illegible]

[illegible] See No. [illegible] Dietary.

Savoury Semolina. Boil the semolina in the milk, stirring [illegible] till well cooked, adding a little more milk if [illegible]. When partly cooked, add one ounce of butter, the grated [illegible] little cayenne pepper, and mustard to taste. Butter a shallow [illegible], sprinkle bread crumbs over it, place the savoury semolina in it, sprinkle more bread crumbs over, add a few bits of butter, and [illegible] in the oven.

[illegible] Fruits. Figs, raisins, apricots, apples, pears, and plums should be washed and steeped over night, then put on to [illegible] in the water they have soaked in with enough added to cover [illegible] while stewing, if needed, stew two or three hours, with [illegible] a little lemon rind.

[illegible] See No. [illegible] Dietary.

DIETARY No. 12.—DYSPEPSIA.

FIRST MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*	Elderly.
	Celery on Toast.						Same as 8st., adding 1 oz. bread.
41	Bread toasted crisp	5	6	7	8	9	
	½ Cup Milk (65 grains).						

SECOND MEAL.

	Macaroni Tomato.					
	One Egg minced (100 grains).					
58	Macaroni	2	2	2	3	3
9	Potatoes	4	6	6	6	6
	Coconut Pudding.					
22	Coconut	2	2	2	2	2
41	Bread	2	3	3	3	3
	One Egg (100 grains).					

THIRD MEAL.

	Welsh Rarebit.					
41	Bread toasted crisp	4	6	7	7	9
125	Cheese	1	1½	1½	2	2
	Orange and Banana Salad.					

For active life add: first meal, ½ cup hot Milk.
Second meal, Cheese ... ... ¾ ¾ 1 1¼ 1¼

CELERY ON TOAST.—*See No. 6 Dietary.*

MACARONI AND TOMATO.—A teacupful of a good brand of canned tomato (or two fresh ones, on which pour boiling water over to get the skins off. Then bruise a little to free juice). Heat to boiling point, then add to three ounces of macaroni cooked about thirty minutes in salted boiling water, also add seasoning; stir well, heat up and serve with a hard boiled egg minced.

(For other Recipes, see page 34).

DIETARY NO. 13.—UNCOOKED.

FIRST MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*	Elderly.
41	Bread	4	4	5	6	7	Same as 8st., adding 1 oz. bread.
95	Almonds, grated	1½	2	2	2	2	
	One large cupful of Milk (130 grains).						

SECOND MEAL.

125	Cheese, grated	1	1½	1½	2	2
41	Bread	4	4	5	5	6
30	Fruit Pie	3	3	3	3	3
	One Banana One Apple } 25 grains.					

THIRD MEAL.

41	Bread	4	5	5	5	7
4	Salad, 6 ozs.					
22	Fruit Cake	2	2	3	3	3

For active life add:

Second meal, Cheese	1	1	1	1½	1½
Third meal, Bread	1	1	1	2	2

(Dietary No. 12. Recipes—continued).

COCONUT PUDDING.—Take the bread crumbs and coconut (dessicated), add an ounce of sugar, and a portion of the outer rind of lemon pared very thinly, mix with the egg well beaten and a little milk. Steam in a bowl three hours.

WELSH RAREBIT.—Grate the cheese or cut into small pieces. Mix with the bread crumbs and a little milk; cook in a saucepan to a creamy consistency, and pour over toast.

BANANA AND ORANGE SALAD.—Slice one banana, remove the white rind from an orange and cut into thin slices. Mix and sprinkle sugar over. Finally place a layer of finely ground coconut over and serve with whipped cream.

DIETARY NO. 14.—UNCOOKED.

FIRST MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*	Elderly.
41	Bread and Butter	3	5	6	6	8	Same as 8st., adding 1 oz. bread.
	Two roast Apples (25 grains).						
	Two Eggs (200 grains).						

SECOND MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*
152	Pine Kernels	1	1	1	1½	1½
41	Bread	4	4	5	5	6
18	Stewed Figs	4	4	4	4	4

THIRD MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*
41	Bread	4	5	5	6	7
125	Cheese, grated	1	1	1	1	1
4	With Salad, 6 ozs.					
22	Plain Cake	2	2	2	2	2

For active life add: second meal, 1 cup hot Milk.

	8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*
Third meal, Cheese	½	½	½	¾	¾

MACARONI AND CHEESE.—Prepare the macaroni as in No. 12 Dietary; drain it, butter a dish, place alternate layers of the macaroni and thinly sliced or grated cheese, place a few pieces of butter on the top, add seasoning and bake until nicely browned.

RICE PUDDING.—Make in the ordinary way. If the rice is cooked in water, the milk added and the dish returned to the oven for about twenty minutes, the pudding will be more easily digested. Cooking milk for hours hardens the proteid.

BARLEY PUDDING.—Same method as rice pudding, but simmering the barley in water for some hours before adding milk.

DIETARY No. 15.—UNCOOKED.

FIRST MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*	Elderly.
	One cup Milk (130 grains).						Same as 8st., adding 1 oz. bread.
41	Bread	5	5	6	7	8	
	Two Bananas (20 grains).						

SECOND MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*
	Two Eggs, poached (200 grains).					
41	Bread	3	4	6	7	8

THIRD MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*
41	Bread	4	5	6	7	8
4	Salad.					
100	Cheese Biscuits	2	2	2	2	2

For active life add: first meal, 1 egg.

	8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*
Second meal, Cheese Biscuits	1	1	1	1½	1½
Third meal, Bread	1	1	1	1	1

CHEESE BISCUITS.—*See page 23.*

DIETARY NO. 16.—FLESH FOOD.

FIRST MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*	Elderly.
71	... Dry Oatmeal for Porridge ...	2	2	2	2	3	Same as 8st., adding 1 oz. bread.
72	... Ham, smoked, medium fat ...	2	2	2	3	3	
	One Egg (100 grains).						
41	... Bread	3	4	5	5	6	

SECOND MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*
	Soup.					
95	... Beef, rump, lean	3	3	4	4	5
9	... Potatoes	4	4	6	6	6
	Rice Pudding.					
36	... Rice...	1	1	1	1	1
	½ Cup of Milk (65 grains).					

THIRD MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*
41	... Bread and Butter...	4	4	4	5	5
4	... Celery as Salad, 6 ozs.					
22	... Fruit Cake	2	3	3	3	3

For active life add: Second meal, 1 oz. Beef.
Third meal, 2 ozs. Bread.

RICE PUDDING.—*See page 35.*

DIETARY NO. 17.—WITH FLESH FOOD.

FIRST MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*	Elderly.
41	Bacon, smoked, medium fat	3	3	3	3	3	Same as 8s adding 1 oz. brea
	One Egg (100 grains).						
41	Bread	4	5	5	6	7	
	Two Apples, stewed (20 grains).						

SECOND MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*
86	Beef, ribs, lean	3	4	4	4	4
9	Potatoes	4	5	6	6	8
	Bachelor's Pudding.					
41	Bread Crumbs	2	2	3	3	3
	½ Cup Milk (65 grains).					

THIRD MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*
41	Bread and Butter	4	5	5	6	8
22	Cake	2	2	3	3	3
9	Prunes, stewed	2	2	2	2	2

For active life add: first meal, 1 cup hot Milk.

	8st.	9st.	10st.	11st.	12st.
Third meal, Bread	1	1	2	2½	2½

BACHELOR'S PUDDING.—*See page 25.*

DIETARY NO. 18.—WITH FLESH FOOD.

FIRST MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*	Elderly.
77	Sausage	2	2	3	3	3	Same as 8st., adding 1 oz. bread.
41	Bread	4	5	5	6	7	
	Two roasted Apples (30 grains).						

SECOND MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*
86	Mutton, shoulder	3	3	3	3	4
9	Potatoes	5	5	6	8	8
30	Piece Fruit Pie	3	3	3	3	3
125	Cheese	½	1	1	1	1

THIRD MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*
4	Salad, 6 ozs.					
41	Bread	4	5	6	7	8
22	Cake	2	2	2	2	2

For active life add:

	8st.	9st.	10st.	11st.	12st.
First meal, Bread	1	1	1	2	2
Second meal, Mutton	1	1	1	1	1
Third meal, Bread	1	1	1	2	2

[illegible]

FIRST MEAL

[illegible]

SECOND MEAL

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Raisin Roll	[illegible]	[illegible]	[illegible]	[illegible]	4

THIRD MEAL

4	Salads, [illegible]					
41	Bread and Butter	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Cottage Cheese [illegible]					

For active life add:

Second meal, Cheese	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Third meal, Bread	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

RAISIN ROLL—*See page* [illegible]

COTTAGE CHEESE—*See page* [illegible]

DIETARY NO. 20.—WITH FLESH FOOD.

FIRST MEAL.

Grains Proteid *per oz.*		8st. *ozs.*	9st. *ozs.*	10st. *ozs.*	11st. *ozs.*	12st. *ozs.*	Elderly.
71	Dry Oatmeal for Porridge or	2	2	2	2	3	Same as 8st., adding 1 oz. bread.
	One Egg (100 grains).						
	½ Cup Milk (65 grains).						
41	Bread	4	5	6	6	7	

SECOND MEAL.

95	Chicken	3	3	3	4	4
9	Potatoes	5	6	6	6	8
	Coconut Pudding.					
41	Bread	2	2	3	3	3
22	Coconut	2	2	2	2	2
	½ Cup of Milk (65 grains).					

THIRD MEAL.

41	Bread and Butter	4	5	6	7	8
9	Prunes, stewed	2	2	2	2	2
22	Cake	3	3	3	3	3

For active life add :

First meal, Bread	1½	1½	2½	3	3
Third meal, 1 Egg.					

COCONUT PUDDING.—*See Dietary No. 12 for Recipe.*

CHAPTER III.

SIMPLE RECIPES

The following recipes are 'uric-acid free,' and it is hoped they will help those to whom pure and simple, yet nourishing food, is the first consideration. Though extremely simple, if carefully prepared and tastefully served, they will be found most palatable.

SAVOURIES.

SOLE, *without fish.*—Boil one ounce ground rice in a teacupful of milk. Stir until it becomes very thick. Add seasoning and set aside to cool. Then form into the shape of soles, and brush over with the white of egg. Fry in good oil. Serve with parsley sauce. (E. C. CHAPMAN.)

SALMON.—Boil four ounces of macaroni in salted water till tender—thick macaroni is the best. While it is cooking blend two ounces of flour with one ounce of butter over a slow fire, next stir in a teacupful of strained tomato. Add seasoning, and stir until the mixture thickens well, then turn it into a bowl. Drain the macaroni when cooked, and mince it, then stir it into the tomato sauce. Stand the mixture aside to cool. When cool form into fritters, dredge with flour and fry in good oil an inch deep. The salmon mixture can be coloured, if desired, with a drop or two of carmine colouring. Serve with parsley sauce.

(E. C. CHAPMAN.)

CHEESE FAGGOTS.—Mix two ounces of flour with three ounces of Parmesan cheese; season with half a teaspoonful of salt and a pinch of cayenne pepper. Add sufficient milk to work into a stiff dough. Roll out and cut paste into narrow strips of about four inches long. With the remainder of the paste make some small rings, into which the strips of paste will be slipped when baked, and send to table faggot fashion.

CHEESE PUDDING.—Boil half a pint of milk, and add to it three ounces of grated cheese and the same quantity of bread crumbs. Stir all together until it boils, pour it into a basin, season with a small half teaspoonful of white pepper and the same quantity of salt. Place the pudding in a pie-dish and bake for twenty minutes or half an hour in a moderate oven. (For two.)

FORCEMEAT PIE.—Boil half a pound of tapioca in one pint of water; make some forcemeat balls as below, viz.: one pound of bread crumbs; three eggs well beaten; a little thyme, parsley, pepper and salt. Mix all together with a little milk if necessary, and roll into balls. Put a little butter into an oven tin, let it brown slightly, put in the balls and bake. Put a layer of tapioca at the bottom of a dish, cut the balls in slices, put a layer of the balls; then another layer of tapioca, and so on until the dish is full. Cover with paste in the ordinary way, and bake.

MACARONI CREAMED.—Prepare two ounces of macaroni—adding a small onion stuck with a clove. Drain it well, taking away the onion. Put it in a saucepan with one ounce of butter, one ounce Parmesan cheese, a pinch of nutmeg, seasoning, a tablespoonful of cream. Heat up five minutes.

POTATO LOAF.—Take some mashed potato, season it with pepper, salt, and a dust of powdered mace, and in a baking-dish which can be sent to table form a round-shaped mould. Scatter fine bread crumbs over, with a few bits of butter on them, and bake in a quick oven till a good brown.

CHEESE DUMPLINGS.—Grate one and a half ounces cheese into small pieces; chop an onion fine, add seasoning, and mix. Have ready some paste; put the mixture in the centre. Enclose and form into a ball; dust with flour, tie up in a cloth, and boil one and a half hours.

POTATO OMELETTE.—Two or three peeled potatoes, boiled; mash with one ounce butter, add two ounces stale bread crumbs and one well beaten egg, a little milk, seasoning and little chopped parsley. Place in buttered dish, smooth the top, cover with thin layer of fine bread crumbs and a few pieces of butter; bake in a brisk oven.

SAVOURY BALLS.—Quantities of bread crumbs and mashed potatoes as in potato balls, one hard boiled egg cut small, a little onion chopped very fine, chopped parsley and thyme, pepper and salt, a little piece of butter melted. Bind all together with beaten egg, form into balls, dip into egg and bread crumbs, place in pie-dish and bake. Serve with brown gravy.

SAVOURY POTATOES.—Cut up an onion and place at the bottom of a pie-dish; cut up about four potatoes, then put a layer of them over the onion. Sprinkle a dessertspoonful tapioca over them, add the remaining potatoes, putting two ounces butter in pieces on the top, add seasoning, fill the dish three parts full with boiling water, and cook in the oven; covered with a crust it is a potato pie; serve with one hard boiled egg to each person.

CHEESE SAVOURY.—One and a half ounces cheese, three ounces bread crumbs; grate the cheese, or chop into small pieces; mix with bread crumbs, a little seasoning, and sufficient milk to make into a thick batter; bake twenty or thirty minutes in a buttered dish.

RICE FRITTERS.—(For six persons).—Wash a teacupful of rice; pour over a pint of boiling water, and put in a jar in the oven, adding more water until the rice is thoroughly soft and will not take up more. All the water must be absorbed, otherwise the fritters will break in frying. Stir four eggs well into the warm rice. They bind the rice better if not beaten before being added. Season to taste. Melt some butter in a frying pan and drop in a tablespoonful to each fritter, keeping them separate. These quantities will make a large dishful.

IMPORTANT NOTE.—*The following savouries should be served with either cheese sauce (see page 22) or Plasmon sauce (see page 30). Eaten alone they are not sufficiently nourishing.*

CREAMED BRUSSELS SPROUTS.—Wash half a pound of sprouts and remove dead leaves, place into boiling salted water and cook twenty minutes, drain and place on a hot dish.

Or after cooking as above, fry in butter and then pour sauce over.

LANCASHIRE POTATOES.— Cut up two pounds small potatoes and a medium sized onion, place at the bottom of a pie-dish, then a layer of potatoes, then a dessertspoonful of tapioca steeped and sprinkled over. Add the remaining potatoes, placing two ounces of butter in pieces on the top. Add seasoning and fill three parts full of boiling water and bake in the oven.

MACARONI: TO PREPARE.—Wash and boil in plenty of salted water half an hour. It should be boiled until quite soft, but not pulpy. Drain well and save the water for stock.

Macaroni and Tomato.—A teacupful of a good brand of canned tomato, or two fresh ones, on which pour boiling water over to get the skins off. Then bruise a little to free juice. Heat to boiling point, then add to three ounces of macaroni, prepared as above, also seasoning; stir well, heat up and serve with toast.

Creamed Cauliflower (No 1).—Steam a small cauliflower, and when done, pour over a small teacupful of cheese or other sauce.

Creamed Cauliflower (No. 2)·—After steaming, dredge with flour, fry in one or two ounces of butter until nicely browned, pour over a small teacupful of sauce, cover with bread crumbs, bake in the oven in a buttered dish until browned, and serve.

Creamed Carrots (No. 1).—Scrape and wash two carrots, steam until tender, cut into suitable pieces, and pour over one small teacupful of sauce.

Creamed Carrots (No. 2).— After steaming, cut to small pieces, dredge with flour, fry in butter and serve with a sauce.

Creamed Celery.—Cut stalks of celery into pieces about an inch long, cook in enough water to make them tender. Finally, if possible, have water absorbed. Serve with cheese sauce.

Creamed Cucumber.—Peel a small cucumber, cut into pieces one or two inches long. Steam, when tender dredge with flour, and fry in butter and serve with sauce.

Tomato Rice.—Three ounces rice, a fourth of a tin of tomatoes, or two fresh ones, one small onion, an ounce butter, one bay leaf, three cloves. Slice and fry the onion in the butter till brown. Take it out and put in the dry rice. Stir it in the butter until every grain is a golden brown. Cook the tomatoes in another saucepan in half a pint of barley water or other stock, with the fried onion, bay leaves, cloves and seasoning. When tender, strain and add the rice, cook slowly until nicely swelled. Heat up, then pile on a hot dish. Serve with sauce.

CREAMED VEGETABLE MARROW.—Peel and cut into chunks a piece of vegetable marrow. Steam it well until tender. Place in a small saucepan, with half or one ounce butter, dredge well with flour, and fry until nicely browned.

CREAMED SPINACH.—Wash, blanch, and chop up finely one pound of spinach. Put in a saucepan, dredge with flour, add seasoning, and one small teacupful of sauce. Heat up a few minutes, and serve with small pieces of toast.

SWEETS.

RICE CUSTARD.—One ounce ground rice, one small teacupful milk, add a little sugar, one ounce grated coconut, and two ounces sweet cream. Mix, and bake in a slow oven.

RAISIN ROLL.—Make a light paste, roll it out thinly; put a layer of stoned raisins on it, sprinkle over a little sugar, roll up, tie in a floured cloth, and steam for two hours.

WHEATMEAL PUDDING.—Take three ounces of bread crumbs, an ounce of sugar, an ounce of treacle, a little lemon rind, mix with the milk, and steam in a bowl three hours.

OATMEAL PUDDING.—Pour over two ounces of best fine oatmeal one pint of boiling milk flavoured with lemon rind, add a little sugar, and place in a well-buttered basin just large enough to hold it. Steam for two hours, and serve with whipped cream, or sweet cornflour sauce, flavoured with lemon juice.

Baked Apple Dessert.—Bake good, tart apples; when done, sweeten and flavour with grated pineapple or grated orange or lemon rind. Put in a glass dish, and cover with a cornflour custard. Bits of jelly may be scattered over the top.

Apple Cream.—One cup of granulated sugar; one cup of thick sweet cream, beat till smooth; then beat the whites of two eggs and add them. From seven or more nice apples take off a thin peeling and take out the core; then steam them till tender; put the beaten cream over the apples when cold in sauce plates.

Baked Apple Dumplings.—Pare some large good baking apples, and cut out the core, leaving the apple whole. Fill the space thus made with a little butter, cinnamon and sugar. Enclose in a paste and put in a shallow pan with a little butter, sugar and water. Bake in a hot oven.

Rice Snow.—Four tablespoonfuls of ground rice; one pint of water; two tablespoonfuls of butter; two tablespoonfuls of sugar; the juice of one lemon; one pint of boiling milk. Put the rice to cook in the water, stirring well, about fifteen minutes; add the butter, sugar, juice and hot milk. Stir well and let the whole boil until thick, then pour it into a dish.

Apple Tapioca Pudding.—Pick and wash one cupful of tapioca, then steep over night. Drain, cover with one quart of boiling water, add half teaspoonful of salt and cook in a double boiler until transparent, which will take fully two hours. Add one cupful of sugar and the strained juice of one lemon, and take from the fire. Core eight large tart apples, arrange them in a baking pan, and pour over them the tapioca. Bake in a moderate oven until the apples are quite tender, and serve cold with sugar and cream.

Rustic Pudding.—Pour a large cup of boiling milk on to three ounces of bread crumbs and let it cool. Add the beaten white of an egg to the milk and bread, also the grated rind of half a lemon. Sweeten to taste. Spread a layer of sliced apples on the bottom of a buttered pie-dish, and then pour the mixture gently over it. Bake for half an hour in a moderate oven. Serve hot, with sifted sugar scattered over.

Date Pudding.—Take half a pound of stoned dates, cut in pieces, and mix with a quarter of a pound of bread crumbs, ditto flour, into which two ounces of butter has been rubbed. Whip the whites of two eggs till very light, using enough milk to make a batter. Place in a greased mould, and boil for two and a half or three hours. Turn out to serve, and pour a sweet lemon sauce round the pudding.

TEA AND LUNCHEON RECIPES.

Nursery Cake.—Mix well one pound of flour, one and a half teaspoonfuls of baking powder, and a pinch of salt. Rub in thoroughly four ounces of butter, ditto sugar, and the grated rind of an orange. Chop and stone half a pound of raisins, and add to the above. Mix into a light dough, with half a pint of milk and a beaten egg. Divide into two portions, and bake for thirty minutes.

Dora Cake.—Beat together three ounces of butter, with the same quantity of sugar. Add to it a gill of sour milk, to which is added a teaspoonful of baking powder. Weigh half a pound of flour, add to it half a teaspoonful of cinnamon, and three ounces of fruit. Sift this carefully into the butter and milk, and beat well. Place in a shallow tin and bake for an hour.

Walnut Cake.—Necessary ingredients: eight ounces of flour, four ounces of castor sugar, ditto butter, and walnuts,

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half a teaspoonful of baking powder, and a few drops of vanilla essence. Beat the butter and sugar to a cream, then add the sifted and dried flour, in which the baking powder has been well mixed. Grate the walnuts and add to the flour, etc. Take the whites of four eggs, whip to a very stiff froth, and beat lightly into the batter. Pour into a buttered pie-dish, and bake for an hour in a moderate oven.

COCONUT DROPS.— Half a pound dessicated coconut, half a pound flour, mixed with half a teaspoonful baking powder, three ounces of butter, four ounces sugar, a pinch of salt. Cream the butter and sugar, add the white of three eggs well beaten. Mix into very stiff dough, adding a little milk and water, if needed. Drop on to a buttered cake tin.

GINGERBREAD.—Mix to a stiff batter, half a cup sour cream, the whites of two eggs, one cup of golden syrup, three cups of flour, one teaspoonful of carbonate of soda, two teaspoonfuls of ginger, and a little salt. Bake in a buttered tin two hours. Raisins may be added.

ROASTED ALMONDS.—Place blanched almonds on tins, and set in a moderately hot oven until nicely browned.

JELLY.—Soak half an ounce of Agar-agar five minutes in sufficient cold water to cover it. Drain and put the Agar into an enamel or brass saucepan with a quart of water. Bring to a boil and boil slowly, until dissolved; then add sugar to taste, also colouring—saffron colour for lemon jelly. Then allow it to boil slowly twenty minutes. If there be any difficulty in clearing, throw in some egg shells while the liquid is boiling. Skim and strain through fine muslin. Lastly, add flavouring and sufficient boiling water to make one quart of jelly. Pour into a mould and stand in a cool place. (E. C. CHAPMAN.)

Bran Cream.—One breakfast cupful bran, two breakfast cupfuls of water, place in a covered jar in a slow oven four or five hours. Press all liquid through a sieve, add sugar, lemon juice, and stand over in cool place to jelly. A delicious and invaluable nerve and brain food.

Orange Jelly.—One pound bitter oranges, two sweet oranges, two apples, one lemon. Wipe fruit, cut into pieces, put into preserving pan, well covered with water; boil one and a half hours, then strain and measure the juice. Allow two pounds sugar to three pints of juice, boil until it jellies. For the above quantity it will take about four and a half pounds of sugar.

Oat Cakes.—One pound oatmeal with a little salt and butter, melt the butter in a breakfast cupful of hot water, stir into the meal, knead a little, roll into cakes and bake.

Wholemeal Bread.—Put into a pan seven pounds of wheat-meal. Add to a quart of warm water half an ounce of German yeast. Make a hole in the meal, pour in the water and the yeast, stir well with a spoon till it forms a stiffish batter; throw a little meal over, place before the fire for about an hour, when it will have risen and burst through the covering of meal. Then add more warm water and two teaspoonfuls of salt, until it forms when kneaded a nice light dough. It cannot be too much worked. Then let it remain covered with a cloth before the fire for another hour. The time, as well as the quantity of water required, depends on the quality of the meal. Finish by baking in a moderately hot oven for about an hour. *Four ounces butter added to the flour makes the bread short and crisp when toasted.*

Wholemeal Fruit Loaf (Honourable Mrs. F. J. Bruce).—One pound wholemeal, two ounces of butter, half-pound sultanas and currants mixed, five ounces moist brown sugar, two teaspoonfuls baking powder, half teaspoonful mixed spice. Mix the flour and baking powder, then add sugar and spice. Next soften the butter and beat to a cream, next add the fruit, well cleaned of course. Mix with these ingredients half a breakfast cup of cold water, stir well, and if very stiff add a little more water. Flour it well and bake in an enamel dish, in a moderate oven, about an hour and a quarter.

PLAIN WHEATMEAL BISCUITS.—Make a porridge or mush of wholemeal, cook twenty to thirty minutes, allow it to cool, then mix with wholemeal flour to a stiff dough, and roll three quartres of an inch thick. Cut into shape and bake.

MILK PREPARATIONS.

HOT MILK.—Heat skimmed milk in a double boiler until a wrinkled skin appears on it. Milk should always be sipped, slowly.

COTTAGE CHEESE.—Add to one breakfastcupful of milk one teaspoonful of lemon juice, lay aside until coagulated, then heat slowly, only until the curd is entirely separated from the whey. Then turn the whole into a colander lined with a square of cheese cloth and drain off the whey. Add to the curd a little salt and cream, if desired, and shape with a spoon or the hands for the table.

BUTTERMILK CHEESE.—Place a jar of fresh buttermilk in a kettle of boiling water—the water must be even with the milk in the pail. Heat until the milk is 140°—test with thermometer, then empty into muslin bags and hang up to drain overnight.

SOUR MILK CHEESE.—Take freshly soured milk and place in a kettle of boiling water until the whey separates from the curd. Scald well, but do not allow it to boil. Pour into cheese cloth and drain. When well drained place in a dish and beat it well with a silver fork; season as desired and shape.

DEVONSHIRE CREAM.—When the milk is brought in, set it to cool in a large earthenware pan about eight inches deep for either twelve or twenty-four hours. Then place the pan just as it is into another containing hot water or upon a hot slab for about twenty minutes, and then put away to cool. Clotted cream is very good with stewed fruit and strawberries, and is liked by some people with bread.

HOW TO MAKE MILK PALATABLE AND DIGESTIBLE.—Warm a pint of milk gently. Drop into it very slowly, stirring constantly, about twenty drops of diluted hydrochloric acid. The milk should be stirred until it cools, when a very fine flocculent coagulum is produced, floating in the whey, which is easily accessible to the digestive secretions, while the whole fluid has lost somewhat of the flat and cloying taste which makes it unacceptable to so many. It will be noticed that milk prepared in this way differs from the various "wheys" in the highly important particular that the casein is retained and used, instead of being separated out as a distinct product, while it avoids the bitterness of pancreatinized milk.—ROBERT T. EDES, M.D., in *Bost. Med. and Surg. Jour.*

MOCK CREAM.—Heat a pint of new milk in a double boiler. When it boils, stir in two tablespoonfuls of sugar and two tablespoonfuls of cornflour, which have been previously rubbed smooth in a very little cold milk. Bring to a boil, stirring constantly; then pour the hot mixture, a little at a time—stirring thoroughly all the while—over the well beaten white of an egg. Return to the fire and boil it until it thickens to the consistence of cream.

SALADS.

Every kind of "sallet" should have all decayed leaves removed and be carefully washed, and after standing in salted water fifteen minutes to free it from any insects, it should be washed in fresh water and drained. "Sallet" bought at shops, celery, cresses, lettuce, etc., should be allowed to stand in fresh water about twelve hours.

Tomatoes may be added to the following salads at pleasure.

ARTICHOKE SALAD.—Boil some small artichokes, and leave them to cool. When cool, drop into the middle of each one drop of onion juice; cut into suitable pieces and place on lettuce leaves inside a salad bowl. Pour salad dressing over them.

ENDIVE SALAD.—Wash the inside leaves of two heads of endive, dry them and place in a salad bowl with finely-chopped shalot. Pour dressing over.

LETTUCE SALAD.—Prepare the tender leaves of a lettuce and stand them in cold water. Dry them and place in a salad bowl. Pour over salad dressing containing olive oil.

TOMATO SALAD.—Scald tomatoes in boiling water for a minute, cool, peel, and cut them into thin slices, and put them into a bowl with a few lettuce leaves, and pour dressing over.

WINTER SALADS

(BY DR. BONUS).

No. 1.—Cut celery finely or lengthwise into shavings, add some carefully picked watercress, failing this, corn cress or small cress, all to be cross cut and forked into a tangle of green and silver. Dressed sparingly with powdered loaf sugar.

No. 2.—Slice finely either salsify, carrot, parsnip, scorzonera, or a mixture of any of them, par-boiled and cooled. Dress with the broth of their boiling and lemon juice. Sprinkle with capers and olives, the latter being stoned. Garnish with tufts of parsley.

HOT WINTER SALAD.—Take the heart of a savoy cabbage, slice very finely. Place in a covered pan with butter and a little chili or white wine vinegar; toss carefully till well heated through, but not long enough to blunt its crispness. Then place it into a bowl, pour the liquid over, add a dressing of sugar, grated lemon peel, and vinegar.

SALAD DRESSINGS.

No. 1.—FRESH CREAM DRESSING.—Take a teaspoonful of made mustard, two tablespoonfuls of salad oil, and work well together. Add a teaspoonful of powdered sugar, a gill of good cream, and (slowly) two tablespoonfuls of white wine vinegar, or lemon juice, add seasoning.

No. 2.—Three tablespoonfuls of lemon juice, two of sugar, half a cup of whipped çream, thoroughly beaten.

FRUIT SALADS.

BANANA SALAD.—Peel and cut four bananas into suitable pieces and place in a glass bowl. Sprinkle over a very little grated lemon rind and the juice of half a lemon. Then sprinkle over one half cupful of fine sugar and the juice of two oranges. Set aside in a cool place before serving.

ORANGE SALAD.—Peel four oranges and remove as much of the white pith as possible. Cut into thin slices and place in a glass bowl. Sprinkle sugar and coconut over and serve. This salad should be eaten at the one meal as it is apt to go bitter.

To Stew Dried Figs, Prunes, Raisins, Apricots, &c.—Wash them quickly, then stand in cold water twenty-four hours, then stew them in an earthenware dish, or in a saucepan, gently, two or three hours.

* * *

Rolls or Sausages.—Rolls or sausages are easily made. No skins are required. The sausage material is rolled in suitable squares of linen or calico, tied at each end, and baked in a buttered tin, or boiled, untied when required, eaten hot or cold, or cut in slices and fried. The following ingredients make good mixtures for sausages:—

1.—Bread crumbs, six ounces; mashed potatoes, six ounces; tomato pulp, four ounces; beaten egg, four ounces; butter, three ounces; salt and pepper to taste.

2.—Cooked lentils, or haricots, or green peas mashed, eight ounces; beaten egg, four ounces; butter, two ounces; parsley, chopped fine, one ounce; salt and pepper.

3.—Cooked onion chopped small, four ounces; bread crumbs, six ounces; mashed potatoes, four ounces; beaten egg, three ounces; butter, two ounces; minced sage, half ounce; salt.

These are suggestive examples. Oatmeal, which is the basis of the Haggis, is nice in sausages.

Aroce Doce.—Stew four ounces rice in one and a quarter pints of milk half an hour. Then add eight ounces white sugar and two ounces grated almonds. Boil until nearly dry, stirring frequently. Turn into plates and sift cinnamon over, or into a dish and eat cold. Delicious either way.

Tea Cakes.—Mix three ounces butter with one pound white flour, add half an ounce cream of tartar and quarter ounce carbonate of soda. Mix with sweet milk, and bake in hot oven.

YORKSHIRE OR BATTER PUDDING.—Five ounces flour, two eggs, three-quarters of a pint of milk. Place the flour in a small bowl, break, and add the eggs with three tablespoonfuls of the milk; beat thoroughly with a cooking spoon until smooth and free from lumps. Add remainder of the milk, pepper and salt, beat again well and pour into a hot baking tin in which about an ounce of butter has been browned.

SAVOURY PIE.—When cold, Yorkshire pudding may be cut into small pieces and put in a pie dish with seasoning. Make a gravy, as page 21, cover with crust and bake.

CHAPTER IV

THE FOOD COMPOUNDS

ABOUT PROTEID

THE term proteid or protein includes the principal nitrogenous compounds, e.g., the lean of flesh, the white of eggs, the casein of milk and cheese, the gluten of wheat.

Protein is the word commonly used by American food chemists, but the word *proteid* is the one used by most British physiologists and writers, hence its use in this book.

While proteid, fat and carbohydrates are all sources of energy, proteid alone is a tissue former. Muscle, tendon and cartilage, bone and skin, the corpuscles of the blood, the casein of milk, are made from proteid. A definite amount is absolutely essential: Professor Atwater states that "the minimum quantity which serves in the adult organism for the repair of nitrogenous tissue, or other purpose not so well understood, has been variously estimated by different observers. It doubtless varies with the kind and amount of work performed. The idea has been advanced that although it is possible to sustain life and perform a considerable amount of work on a diet containing a very small amount of proteid and correspondingly large amounts of carbohydrates and fat, a man is actually better nourished when the nutrients are in about the proportions suggested by the commonly accepted dietary standards."

Professor Atwater's opinion on this matter has considerable weight: it is based upon the results of many years of experimental research.

I do not think that there is much difference between Dr. Haig's formula for regulating proteid by body weight and Professor Atwater's dietary standards, and the Haig formula is valuable because it obviates waste.

Proteid is often referred to as a flesh-forming substance; this is in part incorrect, as proteid performs the additional function of supplying energy. A reference to page 19 will show that it supplies the same energy, weight for weight, that the carbohydrates, starch and sugar provide.

Researches have been carried out by Schwann, Klein, Brown-Sequard, and more recently by Gautier, of Paris, which demonstrate the fact that proteid performs an important function in nourishing nerve tissue. This is an important discovery. I believe that the theory is a correct one. I have watched the action of additional proteid to the diet in several cases of apparent nerve weakness, and have invariably noted an increase of vigour and strength follow the use of more proteid: say white of egg, hot milk, or milk casein, in cases of immediate need.

A study of physiology will reveal the fact that the nervous system controls the circulatory and muscular systems of the body. If this be so, it must follow that if the nervous system is well nourished the whole body will respond and become healthier and stronger in every way. When the diet is properly balanced the nerves and other centres are each supplied with needful nutriment. Another important physiological fact should not be overlooked by dyspeptics, and that is that where the supply of proteid is insufficient, the strength and vigour of the digestive juices is not maintained.

Food chemists are of opinion that vegetable proteid is not so thoroughly assimilated by the body as animal proteid. I think this is explained by the fact that a diet of say potatoes, alone or pulse, or cereal food, must be very monotonous to the appetite. Rubner, whose experiments in this connection are so often quoted by physiologists, fed his laboratory servant on nine ounces lentils boiled soft, and six pounds of potatoes. It would be almost impossible to eat such quantities of food without bolting them, *i.e.*, with but little mastication, in which case there would be a good deal of the proteid unused.

The writer hopes, in a later edition of this book, to publish some experiments to be made upon him by a food chemist. The food used will be vegetable only.

FATS AND CARBOHYDRATES.

Fat is largely supplied by animal foods, as flesh, fish, butter, etc. It is also abundant in nuts, with one or two exceptions. Almonds, peanuts, Brazil nuts, walnuts, hazels—not fresh ones—pine kernels, and some other kinds, all contain over 50 per cent of fat. It is also present in the germ of cereals and other seeds. When fat is eaten, it is stored in the body as fat. The fuel value of fat is double that of the carbohydrates. This high fuel value explains the economy of nature in storing fat in the body for use in case of need. Fat is the most concentrated form of body-fuel.

THE CARBOHYDRATES.

These include such compounds as starches, sugar, and the fibre of plants or cellulose. They are found chiefly in vegetable foods, as oats, wheat, barley, rice, and potatoes. Milk contains a considerable amount of milk sugar—a carbohydrate. Starches and sugars are important food ingredients; they form an abundant source of energy, and are easily digested. They are transformed into fat in the body.

Fat and Carbohydrates are the chief fuel ingredients of food. Sugar and the starch of bread and potatoes, etc., are burned in the body to yield heat and power. The potential energy which is latent in the food is transformed into heat and power; the heat is used to keep the body warm, the mechanical power for muscular work. Heat and power is produced by the oxidization of the food. The metabolism of fats and carbohydrates is more perfectly carried on where there is an abundant supply of pure air. More fœces are passed by those who dwell in towns and cities than by those living in the country or at the seaside, because the greater supply of oxygen more perfectly oxidizes the food. It is for this reason that perfect ventilation in the home and everywhere is so necessary. Research in recent years has enabled food chemists to measure the energy latent in food materials. This is done by an apparatus called the bomb calorimeter.

The unit commonly used is the calorie, the amount of heat which would raise the temperature of one kilogram of water 1° C. or 1 pound of water 4° F.

In experiments on the metabolism of matter and energy in the human body, 1898-1900, Professors W. O. ATWATER and F. G. BENEDICT, published the details of 13 experiments with man, in which the balance of income and outgo of nitrogen, carbon, and energy was determined. These were made with the aid of the respiration calorimeter. In a number of experiments the subjects performed more or less severe muscular work, in others there was as little muscular activity as practicable. From these and earlier experiments, a number of general deductions were drawn which have to do with such topics as the food materials supplied and consumed, and the difference in demand of men at work and rest, the elimination of water, carbon dioxide, and energy under different conditions of work and rest. Especial interest attaches to the results which have to do with the measurements of energy. The following table shows the average percentages of energy given off from the body in the rest and work experiments:

Percentage of total energy given off from the body in different ways.

HEAT.	In rest experiments.	In work experiments.
	Per cent.	*Per cent.*
From skin by radiation and conduction (and in exhaled air)	74·2	62·3
In urine and fœces	1·4	·5
In water vaporized from lungs and skin	24·4	30·8
Heat equivalent of external muscular work done	......	6·4
Total	100·0	100·0

The following table compares the amount of potential energy in the food materials actually oxidized in the body with the amounts of kinetic[1] energy of sugar delayed fatigue and increased the working power.

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[1] When fuel is oxidized, in technical language the potential energy is kinetic: it is transformed into heat and power.

Important investigation was also made by Prof. Vaughan Harley, by Dr. Langemeyer and Professor Stockvis, of Amsterdam. The two latter gentlemen carried on their experiments over a period of eight weeks.

In February, 1898, the results were published of some tests made by Dr. Schumberg in Professor Zuntz's laboratory, in Berlin, and which were authorised by the Prussian War Office.

Dr. Schumberg says:—"The practical conclusion to be drawn is that sugar in small doses is well adapted to help men to perform extraordinary muscular labour."

A practical test was then made with soldiers of the German army during autumn manœuvres. They were supplied with 70 grams sugar, or 2⅔ ounces. The results were in every way to the advantage of the men using sugar, the sugar being relished during the whole time.

On long marches it appeased hunger and mitigated thirst; a feeling of refreshment followed which helped the tired man on his way, and none of the soldiers allowed sugar were at any time overcome by exhaustion. It was found that both their pulse-rate and breathing were less affected by exertion than was the case of the men consuming no sugar.

The investigation led to the recommendation that the sugar ration of the German soldier be raised to 60 grams of sugar a day.

Sugar is, therefore, seen to be valuable in limited quantities where hard muscular labour is undertaken, because of its being more rapidly assimilated than starch. The statements that sugar causes gout and rheumatism are not true.

THE MINERALS OR FOOD SALTS.

As we have indicated in the chapter on physiological demands, the mineral part of food plays a very important part in assisting digestion and in promoting metabolism, *i.e.*, the change that food undergoes inside the body. Dr. Lahmann has well-named this part of the food supply—food salts. None can read his invaluable book without feeling that, as he points out, ordinary food lacks the proper supply of salads and green vegetables. These foods supply the body with the lime and soda: the soda assists in eliminating the poisons produced in the body. As Lahmann says: "Blood which contains too little soda cannot regulate the gas exchange of the blood and of the tissues: an excessive accumulation of carbonic acid takes place in the body, the oxidation, that is the manufacture of carbonic acid, being comparatively unhindered, whilst the excretion of carbonic acid is rendered difficult."

Soda + lime,

Salicylate Soda in rheumatism

Oxygen p.68

A 67

The vegetables which contain the most soda are—spinach, summer endive, radishes, carrots, dandelion, lentils. (See Wolff's table, end of book).

Ordinary food is also deficient in lime. It is Dr. Lahmann's opinion that rickets, stunted, irregular teeth, the tendency towards disease of the bones generally, may be traced to an insufficient supply of lime salts in the food.

[illegible]

Salad food is rich in lime as well as soda. For example: onion has 22, cabbage-lettuce 14, radish 14, celery 13, turnips and carrots 11, eggs 10, cereals 2 to 3 per cent; flesh 2, poultry 3 per cent of the total analysis of the ash.

ARTERIAL DEGENERATION.

[illegible]

The bone fragility of old age is due to the want of these lime salts. We must, I think, realise the important bearing that this subject of food salts has on health and general well-being.

Many elderly people have had their latter days haunted and robbed of peace by that unfortunate theory that is met with at times, viz.: that the bread stuffs, green, and other vegetables, cause calcareous deposits in the arteries, and bring on premature old age. There is no truth whatever in this theory; it is absolutely incorrect, and was put forth at a time when the chemistry of food was not so well understood as now.

Agricultural and botanical science have shown us that the mineral substance of plants is soluble and organic, that plants transform the inorganic minerals from the soil into soluble substance. The mineral matter in vegetables should, therefore, be regarded as living food. The mineral matter in flesh is only partly living, as it has been used in the body of the animal.

Dr. Alexander Haig, in his "Diet and Food,"[1] discusses this arterial degeneration theory, and states that "the teaching of Pathology shows quite clearly that atheroma of the vessels is always associated with pressure and strain . . . . The suggestion that vegetable foods cause chalky degeneration by introducing mineral salts into the blood, is one of the most puerile bits of physiology it has ever been my lot to meet with. How terrible, then, must be the fate of those who pay frequent visits to the mineral spas of Europe, especially to those which are rich in mineral salts."

The following is taken from a lecture given in 1882 by the late Chas. D. Hunter, M.D., F.C.S., etc., the well-known physician at Smedley's Hydro, Matlock:—

No one dies now-a-days over fifty years of age without showing evident signs of arterial degeneration, and few reach forty perfectly free from it. It is not uncommon in young people; and in young children—infants, who die of atrophy or marasmus, it is almost invariable. Doubtless our pathologists are more numerous, and probably more exact, than they were 50 years ago; but it does seem as if this degeneration of tissue, this semi-death of some of our organs, were terribly more common than it used to be.

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[1] J. and A. Churchill, London; 2/-

There are many forms of degeneration, and whilst the causes of most are very obscure, some are evidently due to faulty food. Many forms frequently co-exist, and seem at times to be but different stages of the same process, which gives hope that in avoiding one we may avoid all.

One form of degeneration seems to be due to saline starvation. Physiologists have talked too much of the nitrogen and carbon of food, of which few can escape getting enough if they can get food at all. But of the other half-dozen elements, all equally essential to life, and some more essential to health, we have heard but little since Liebig died. And yet some of these are the very elements which many who try to be well-fed are starved in. Some are exceedingly soluble, and thus easily lost by careless or foolish cookery; and others reside most in or near the skin or husk, which a false taste excludes from our tables.

Those who dine at ordinary tables, where exclusion of animal food is the only selection they can make, are especially liable to suffer. It is an old and a cruel experiment, that of the French academicians, who fed dogs on washed flesh meat until they died of starvation. The poor animals soon became aware that it was not food, and refused to eat it. Were our instincts as natural, no charming of the eyes or tickling of the palate by our cook would persuade us to swallow those washed and whitened foods that deceive us into weakness.

Analyses of the liver and other important vital organs after death show that in some diseased states these organs contain only one-half of certain saline matters that are invariable in the healthy organ. And not only so, but that in proportion to this deficiency, the organ is useless for its work. In fact, as the organ changed its tissue (as does every part of the body every three or four years), and was compelled to renew itself in the absence of sufficient potash and phosphates, it did its best to preserve its form and structure much as a fossil does. It rebuilt itself best as it could of such material as would make tissue with the minimum of potash; but such tissue, whilst useful and conservative in retaining the form, elasticity, and contractility of the organ, is as useless for secretion and excretion as a fossil liver.

Not only the liver, but the kidneys, spleen, and brain, and the small blood-vessels in every part of the body share in this degeneration of tissue: and strangely enough (and not unlike the French experiment), this amyloid, waxy, or lardaceous tissue is [illegible] juice. It is *washed flesh* [illegible] poor, and is good for nothing [illegible].

The [illegible] those poor dogs contained [illegible] and carbon: but these alone, [illegible] were as useless as stones in the absence of [illegible]—not of common salt, be it [illegible] that is found in excess in the fossil [illegible]. The essential salines that can be [illegible] washed out of food are chiefly two—potash salts and alkaline phosphates. These are also the two that are most deficient, about 50 per cent, in the waxy form of degenerated tissue. This is the type most common in atrophied children, and in persons suffering from consumption and other wasting diseases, but it is not uncommon in the capillaries, and small arteries of many who *seem* in health.

When vegetables are soaked in cold water to keep them fresh,[1] when they are blanched in hot water to please our eyes, or when they are well boiled and their essence drained off that we may eat the depleted residue, those soluble salines are almost entirely extracted. And what are left? Chiefly the less soluble salts of lime and magnesia—just those elements so abundant in the cretaceous degeneration of blood-vessels. Potash is the alkaline element of formed tissue; its absence is one great cause of scurvy, as well as of the waxy and perhaps the cretaceous types of degeneration. A little examination of our modern commoner foods will show how deficient they are in this element.

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[1] Place the roots only of salads and vegetables in water when it is desired to keep them fresh.

Bread was, I suppose, at one time the "staff of life," but it could hardly have been white bread. Of it, one pound contains about seven grains of potash, or nearly 20 grains less than a pound of brown bread. Potatoes, if peeled, steeped, and boiled in plenty of water, contain only about 21 grains in the pound, as against 37 if boiled in their skins. The skins surpass the centre about fourfold in salines. Cabbages and all leafy vegetables lose much more, as the water goes through every portion of them.

Arrowroot, cornflour, and most of those prepared foods are more deceitful than the washed flesh of the French academicians. Stewed fruits, as made by some cooks, are also guilty of the wash. Even porridge, haricot beans, peas, etc., are by some cooks soaked when raw, and thus much depleted. No wonder if this generation finds itself degenerating. Like a ship built of rotten timber, such a man goes all very well in good weather and with a light load; but when one can neither bear an average load, nor undergo unusual fatigue, let him cross-question his cook.

Not all suffer equally. Some soon fail, while others seem endowed with such first-rate viscera that they never seem to feel the loss. Those of a rheumatic type suffer most, because there is in them an inherited tendency to the formation of uric acid and other poisons due to mal-assimilation. Now, experimentally (not on dumb animals, but on men), it is found that potash, and especially its organic salts, has great power to dissolve out and remove from the body those gouty and rheumatic blood poisons. Therefore, those of this type exposed to saline starvation are liable to the many-headed sufferings of those diseases—dyspepsia, nervous irritability, pains in any and every part of the body, neuralgia, sciatica, lumbago, gravel, rheumatic fever, heart disease, and calculus. But I must stop. A page could easily be filled with a list of the protean maladies due to this condition. Others who suffer, while not inclined to the rheumatic diathesis, tend rather to the anæmic class of diseases, and suffer from pallor, weakness, inability to endure fatigue, etc. In the more extreme cases they exist rather than live, rousing up now and then under some stimulus only to relapse next day into greater weakness.

There are some foods especially abundant in potash salines, and for the benefit of those suffering from, or liable to suffer from their loss, it may be well to know these and how to use them. Easiest of use and ready to hand is bran tea. It is easy to purchase bran in any large city, and to make a strong infusion of it, at the rate of a good tablespoonful per head. This is especially rich in both potash and soluble phosphates, the two most important and easiest to be lost of the food salines.

GRAINS OF POTASH AND PHOSPHATES PER POUND.

	Potash.	Phosphoric Acid.		Potash.	Phosphoric Acid.
Bran	93·1	201·6	Barley Flour	40·6	66·5
Beans	80·5	55·3	Potato	39.2	12·6
Flax Seed	72·8	91·0	Beets	30·1	5·6
Peas	68·6	61·6	Oatmeal	29·4	38·5
Rye Flour	45·5	59·5	Carrots	22.4	7.7
Cabbage Heads	42·0	14·0	Turnips	21·0	7.7

The above are all *rich* in potash, but other things (fruit, etc.), containing less, may yet supply more by the larger quantity one may eat, and by the absence of, or by the mode of cooking, avoiding any risk of loss. The fruits best to use for this purpose are, in order of richness, strawberries, greengages, plums, pears, and oranges; and of vegetables, rhubarb, celery, lettuce, endive, watercress, and dandelion.

Vegetables of all kinds should be cooked in soups only, for the water gets the *quality* of the vegetable, though the solid part may retain the quantity. Dyspeptics who say they cannot eat vegetables will find the strained soup of them quite light, easily made pleasant, and of more value to them by far than the boiled vegetable itself.

[illegible]

In the dietaries supplied in this book, the salads are given their proper place. It is important that all vegetables should be steamed, as this insures the preservation of the food salts.

While discussing this subject of mineral matters, I should like to mention a very good soap which differs from other soaps, in that it contains a natural alkaline substance derived from the plant from which this soap takes its name (Barilla) and which grows by the sea. It is gathered, dried and burned, and the ash which remains is utilized in the manufacture of "McClinton's Barilla Soap," in place of the caustic soda commonly used. It is made by Messrs. Brown and Son, Donaghmore, Tyrone, Ireland.

Barilla soap has decided curative property; it is very soothing in skin troubles, and if no other soap is used it prevents the hands from chapping.

I have asked Mr. Samuel Saunders, of Market Lavington, Wiltshire, to give me particulars of his habits of life for publication. Mr. Saunders, in a letter dated 9th October, says:—"I rise between six and seven a.m., give myself a good rub down with my hands dipped in cold water and a little soap; I dry with a sponge, next with a soft towel, then a good rub with the hardest towel I can get, finally a good scrub with a sharp hair brush. I then run 200 yards at twice, using as much action as possible and breathing as full as possible. I repeat this running occasionally during the day. In fine weather I spend three or four hours a day working in the garden, three or four in my office, and the rest of the day reading and napping. My meals are as follows: Breakfast, three ounces sharps or wholemeal, or Quaker oats, made into porridge; two teaspoonfuls of plasmon, the yolk of one egg.

"Dinner: A small plate of three vegetables, three dessert spoonfuls of baked brown bread crumbs, a small plate of milk or fruit pudding.

"Supper, 6 p.m: A breakfast cupful of barley water with a dessert spoonful of Carnos, six slices of thin bread and butter, two roasted apples.

"This food costs me 8d. a day. I sometimes take a little fruit at breakfast and in the afternoon. I take no tea, coffee or cocoa, or condiment of any kind, save a very little salt at dinner-time. I have no teeth, and therefore find bread-crumbs, mixed with my vegetables at dinner, a very nice way of taking bread. I take no drink except the barley water at supper time. I think the plasmon and my running keep me supple. The carnos is a pleasant relish; I question if it is any other good.

"I retire to rest at 9.30. I am now in my 89th year; have never had a headache or any serious illness. I have taken no intoxicants for 72 years. I have eaten no flesh or fish for 62 years, and have never used tobacco."

I have had the pleasure of meeting Mr. Saunders twice at his fruit farm; he is a successful fruit grower. Though nearing his 90th year, he is active mentally as well as physically, and can still look out on life with a progressive and hopeful spirit. The following is his autograph, taken from the letter I have quoted—

Saml Saunders

I cannot detect any difference between this writing and that of eight years ago.

Wm. Thomas,
Manchester.

The other signature is that of another friend whose life is simple, and who manifests in his 80th year unbounded energy. The handwriting of Mr. Thomas' is singularly strong and good. This autograph was written with a very fine pen, which would not hide tremors. Mr. Thomas' diet is largely bread and jam, about one egg daily, plain vegetables, and very weak tea once or twice a day.

Both these autographs indicate strength of nerve and muscular power, and are the best and most practical denial of the arterial degeneration theory as being caused by the use of bread and vegetable food.

OUR DAILY BREAD.

Throughout this book there has been much reference to misconceptions regarding foods and food compounds, and exception must now be taken to another. It is the prevalent idea that brown or wholemeal bread is more nutritious than white. I was in a store lately when a woman was buying a loaf of wholemeal bread, as she took up her purchase she remarked that "one of these loaves is worth two loaves of white bread." This statement, and others of a similar nature commonly made, are not true. White bread contains as much proteid and as much starch as wholemeal bread, but the latter is richer in food salts, containing about ⅙ of an ounce more in every pound, than white bread. This is where wholemeal bread is superior to white, and it is a considerable difference.

We have seen in the chapter on mineral matters what an important part these food salts play in preserving the bodily health, and we are unwise if we allow any of them to be lost from our food. In 1891, Gustav von Bunge published the results of some experiments made to determine the amount of iron in 100 grams of various cereals. He found that rice contained 1·2, peeled barley 1·4, wheatmeal 1·6, whole barley 4·6, rye 4·9, whole wheat 5·5, bran 8·8 milligrams.

Experiments were then made by this eminent food-chemist to determine whether this iron was assimilable, and the results showed that it was assimilated and converted into hæmoglobin. Bunge's experiments help us to understand why whole wheat preparations are so useful in cases of anæmia. I know many instances where this ailment has been cured by the use of whole wheat bread.

But while whole wheat bread is so useful, it should be made from finely ground wheat. The bran should be finely cut or the food is passed from the body with much of its nutriment unused. To further guard against such loss the bread should be very thoroughly masticated, and I would strongly recommend the home grinding of wheat. Sutcliffe's mills[1] are the best for this purpose, they cost 25s., 32s., and 45s., with fly wheel. With an old bicycle frame attached, it is possible to grind with the feet, and to produce very finely ground meal. Red wheat should be used. It should be picked, washed and dried before using.

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[1] From the Health Food Stores, 19 Oxford Road, Manchester.

The decay of human teeth which is so prevalent at the present time, is due, in my opinion, to the common use of white bread, which is, we have seen, deficient in phosphates. It is our interference with the natural food balance of the wheat berry which works the mischief. When we retain or preserve this balance the difficulty is overcome. It is remarkable that wherever we find a race of men retaining primitive milling customs, or living on uncorrupted grain food, we find their teeth strong and free from decay. Mr. Albert Carter, surgeon dentist, related in "Natural Food" some few years ago, some investigations he had made in this connection. He found the natives of the Punjab and N.-W. Provinces—whether Hindoo, Sikhs, Punjabees, Afghans, or Goorkhas, had splendid teeth. He went to the banks of the Ganges and examined the Brahmin skulls. He failed to find one showing general dental decay such as he was acquainted with at home. In Ceylon he found that while the native Singalese had good teeth, the children of European parents had dreadfully bad teeth. In Australia it was the same, the aborigines had splendid teeth, while the Melbourne dentists were hard at work repairing disease in the Colonial-born portion of the population. Edwin Cox, Licentiate in Dental Surgery, R.C.S., in "Degeneracy and Preservation of the Teeth," ascribes teeth degeneracy to the use of white bread. This is undoubtedly a serious and important subject, and must continue so while we consume more bread than any other one food. Bread should be of the very best kind available, and when it is made from the best kinds of wheat it forms an almost perfect food. For many years I have observed the beneficent results that have followed the use of good wholemeal bread; with it there is scarcely any toothache or neuralgia, and constipation is scarcely possible. The teeth are made stronger and less tender, owing to the proper supply of lime and phosphates contained in wholemeal.

Where white bread is used and change to the wholemeal bread is difficult, it is advisable to boil bran for an hour or more in soft water, to drain off all liquid, and add it to the white flour. Also it should be remembered that cheap flour and common white bread are sweeter in flavour and better than the finer and whiter kinds.

It is a most difficult thing to get a pure wholewheat meal. The miller tampers with the wheat in every way. He sifts it, or he adds a percentage of rye to keep it moist, as most people are too impatient to eat stale bread or to masticate it properly. The Wholemeal Co., 369, Chorley Road, Swinton, Lancashire, manufacture wholemeal from the English wheat, and no part of the grain is omitted. An objection to wholemeal bread commonly met with is that less of its proteid is digested than when white bread is eaten. Mr. John B. Coppock, F.C.S., has made some experiments to test this point, the results *show* that white bread is inferior to wholemeal in this particular. Mr. Coppock finds that out of 100 ounces of *white bread*, 96 ounces are digested, and out of 100 ounces of *wholemeal* 95¾. Out of 100 ounces of *white bread proteids*, 85½ ounces are digested, out of 100 ounces of wholemeal bread-proteids, 88¾. As a flesh-former, therefore, brown bread stands first, and as a contributor of phosphates and salts it also occupies the same place. Where whole wheat bread cannot be had, the best substitute is Hovis bread; every ounce contains 9 grains more proteid than the same weight of other bread. Hovis flour consists of 75 parts of the best white flour and 25 parts of the germ of wheat. The wheat germ, rich in fat and proteids, is mixed with salt and cooked by special machinery. The process causes Hovis flour to take a large quantity of water, which, along with the fat it contains, keeps it moist.

Dr. Haig and Mr. Eustace Miles have both a high opinion of Hovis; it is rich in proteids, but deficient in food salts.

In a Bulletin issued by the U. S. Dept. of Agriculture, the following analyses of flours appear:—

	Water per cent	Proteid per cent	Fat per cent	Carbo Hydr's per cent	Ash per cent
Pillsbury's Best Flour	10·853	13·062	1·327	74·33	·428
Graham Wholemeal Flour	10·825	14·812	2·988	69·897	1·478
Patent or White Flour	12·362	12·437	1·620	73·075	·506

These flours when made into bread have the following analyses:—

	Water per cent	Proteid per cent	Fat per cent	Carbo Hydr's per cent	Ash per cent
Bread, Pillsbury Flour	36·700	10·125	·750	51·969	·448
,, Wholemeal Flour	34·244	9.375	3·251	51·874	1·276
,, White Flour	32·80	8·875	3·539	54·175	·621

When about four ounces of fat is added to six pounds of flour before kneading, the bread makes delightfully crisp toast.

HOW MUCH FRUIT.

For a long time now I have deprecated the too free consumption of fruit. All sorts of foolish and misleading statements are to be met with regarding the wonderful properties of fruit. A great deal of extravagance and gush is indulged in by many who write on health matters about this delightful food and its dietetic properties. I regret that I have done so myself, but it was some years ago, when I knew less about the science of food than I do now. Fruit is so beautiful, it is so delicious to the palate, that it is easy to eat too much. Many who would be ashamed to over-eat of rich food, do not think it wrong to eat too much fruit. Too much of any food is *gluttony*,—that is a bald statement, but it is nevertheless true.

There is as much need for *balance* to be sought after in using fruit, as in the use of other foods.

Too much fruit, besides making the blood too acid, takes up stomach space that should be filled with food of a more nutritious character. I have long held the opinion that fruit is not so much needed in cold climates as in hot countries, where the tendency to fevers demands the cooling acids that fruits supply. Fruit acids are invaluable in colds, influenza, and fevers, but I am confident that they are not so useful for everyday use as the salads, green vegetables, and roots. The latter we can take direct from the earth for the greater part of the year, but there are only a very few months in the year when we can get fruit poured into our lap, and this is supplied at the times when we most need its special medicinal properties. I have dealt with this subject at some length in "Fruits, Nuts and Vegetables," it is not therefore needful to enlarge on the subject too lengthily here.

It is not necessary to eat more than two apples a day (about eight ounces), or three apples (12 ounces), or the equivalent of other fruit. Anything beyond that amount is certainly unnecessary, except in some special cases when a physician might order more fruit. I have seen cases of sore eyes, sciatica, piles, skin rashes, be relieved in a week or so by withholding fruit altogether, and substituting salads and steamed vegetables. The case of Mr. H. J. Bateman, of the Wholemeal Co., is an example:

his diet is very simple, and pure wholemeal bread, from freshly ground wheat, forms the bulk of his food. He spends the greater part of his time out-door. For many years he has suffered at intervals from hæmorrhoids (piles). At my suggestion he gave up the use of fruit, and has scarcely been troubled since making the change in his food; a very little fruit will bring a return of the piles; half a pound of so mild a fruit as strawberries will revive the trouble. I could give numerous instances of fruit acting as an irritant in this or similar ways.

I would like to point out that I am writing for those who suffer from weakness and from inherited limitations of one sort or another, I must however state my conviction that for healthy persons to eat more fruit than is needed, is to waste it and to disturb the *food balance.*

WHEN TO EAT FRUIT.

I am strongly of opinion that fruit is best eaten alone and not with other food, especially not with starch food.

I recently made a number of test tube experiments with Mr. Harrison Jackson, of Manchester. Mr. Jackson is the inventor of the process for neutralizing the tannin in tea, he has conducted test tube experiments for several medical journals. From my observation on the action of fruit when eaten with starch food by dyspeptics, I stated that we should find that the acid fruits delayed it, while vegetable juices would not delay it. The first experiment was with lemon, orange, grapes (white and black), apples ("greening" and "russet"), and tomato. In the case of the tomato, the starch digestion was completed in 30 minutes. But the starch with fruit juices was not digested an hour afterwards.

On another day we took portions of turnip, carrot, Brussels sprouts, celery, onion (English), onion (Spanish), and pineapple; these were finely shredded, the fibre as well as the juice being used in the experiment. The pineapple was treated in the same way. The same result was arrived at as in the first experiment, and we came to this conclusion: that the difference in the digestion of starch with vegetables and fruit is very great, that the digestion of starch with vegetables and pancreaticus occupied only one third the amount of time needed for the digestion of starch with fruit juice.

Since these experiments were made I have seen some notes of experiments made by Mr. P. M. Short, B.Sc.,[1] in which it is stated "that apples retard the digestion of starch in the stomach, and in the case of test tube experiments, prevent the conversion of starch when they are highly acid."

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[1] Constipation: Its Cause and Cure. Health Food Stores, Manchester.

The sugar test applied to fluid drawn from the stomach showed but slight change in the amount of sugar present, as compared with the sugar in the food before fruit was introduced into the stomach. Whereas when the fruit was excluded from the diet, the precipitation of cupric oxide, on applying Fehling's test to the fluids drawn from the stomach, was 50 per cent more. This Mr. Short accounts for by the retarding action of the malic, citric, and other acids present in fruit upon the ptyalin or salivary digestion.

Peptic digestion was assisted by ripe fresh fruit. But test tube experiments were not conclusive.

Mr. Short recommends that fruit should be taken in the morning one hour before breakfast, or about half an hour or more after meals.

Mr. J. W. Biggart, B. Sc., Borough Analyst, Greenock, in a lecture delivered in Glasgow, said that it was his custom to put apples under his pillow overnight to warm them, and to eat them while dressing in the morning.

In my judgment, it is best to eat fruit two and a half hours after the morning meal, or three hours after the mid-day meal. Or to take say two or three apples (8 to 12 ounces), with three ounces of grated cheese as luncheon mid-day, without bread or starchy food. All this of course applies to those having sensitive digestions. I do not believe in weak stomachs, or in enfeebled digestions. All these imaginary conditions will not exist where the dietary is properly adjusted, and the life rightly ordered—that is, where proper rest and sleep, cleanliness, and good ventilation are observed.

POISONS IN FOOD.

All manner of extravagant claims are at times made by food reformers when advocating the desirability of abstinence from the flesh of animals as food. Some of these reformers maintain that cancer and many other diseases are caused by the use of the flesh of animals, and animal products. These claims cannot be supported by actual fact. There is however a considerable amount of indisputable evidence regarding the hurtful substances present in some foods. During recent years, a great deal of invaluable research has been carried on to determine the presence of poisons in food. The poison substance is not of course called by the name poison, but *purin*, or xanthin bodies; Dr. Haig simply calls it poison. It is from the purin or xanthin bodies that uric acid is derived, or formed in the body. I have no wish to dogmatise on this matter, but will give the figures supplied by physiological chemists as to the quantity of "purin bodies" that are found in some commonly used foods.

Undried Purin in Flesh Foods, Fish & Poultry.

Fish.	Grams per kilo.	Grains per lb.
Cod	0·582	4·074
Plaice	0·795	5·565
Halibut	1·020	7·140
Salmon	1·165	8·155
Meats		
Tripe	0·572	4·007
Mutton	0·965	6·755
Veal,		
Loin	1·162	8·137
Neck		
Pork,		
Loin	1·121	8·487
Neck	0·567	3·969
Ham (fat)	1·155	8·085
Beef,		
Ribs	1·137	7·959
Sirloin	1·305	9·135
Steak	2·066	14·455
Liver	2·752	19·264
Sweetbread.		
Thymus	10·063	70·431
Chicken	1·295	9·065
Turkey	1.260	8·820
Rabbit	0·970	6·314

Purin in Vegetable Foods.

	Grams per kilo.	Grains per lb.
Bread, white, no trace.		
Oatmeal	0·530	3·4563
Rice, no trace.		
Peameal	0·390	2.5413
Beans, Haricot	0·6375	4·1661
Potatoes	0·0200	0·1400
Onions	0·090	0·0630
Tapioca, no trace.		
Cabbage, no trace.		
Lettuce ,,		
Cauliflower ,,		
Asparagus	0·2150	1·5050
Tea	Dr. Haig grains in a lb.	175
Coffee		70
Cocoa		59
Lager Beer	0·1250	1·0955
Pale Ale	0·1450	1·2708
Porter	0·1550	1·3578
Wines.		
Volney	no trace.	
Claret		
Sherry		
Port		

Dr. Walker Hall, from whose invaluable work[1] these figures are taken, states that "milk, butter, eggs and cheese should be placed under the heading of animal foods. Eggs contain no free purin or purin yielding substance. Butter and cheese are derivatives from milk, and so may hold traces of nuclein (purin) bodies. In milk, Petren was unable to find any purin bodies.

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[1] "The Purin Bodies in Foods." Sherratt & Hughes, Manchester. 2/-

An estimation of my own yielded 0·0020 grain N per litre. The quantities are very small.

These four articles of diet, e.g., eggs, milk, cheese, butter, form together our most valuable means of withholding purin substance from the body, and yet allow the provision of a diet at once digestible, easily absorbed, and capable of maintaining nitrogenous equilibrium."

Dr. Walker Hall, after determining the amount of food purins in foods, placed himself on a purin free dietary, and on a dietary containing purin bodies. The purin free dietary experiment was carried on for eight days, and the food consisted of eggs, milk, bread, cheese, butter, sugar. On this almost purin-free diet, an average of 0·1623 grams purin N per day was excreted.

When a purin diet was used with the addition of 450 grams of chicken, the purin N excreted was 0·2650.

With the addition of	530	grams of	plaice,	0·2489
"	400	"	beef,	0·2480
"	408	"	beans,	0·1857
"	1700	c.c.	lager beer,	0·2218
Usual mixed diet	. . . .			0·2475

It is not necessary to enlarge on these results. If however these excretions (from a purin diet) of purin N are compared with the excretion of purin N while on an almost purin free diet, they speak for themselves.

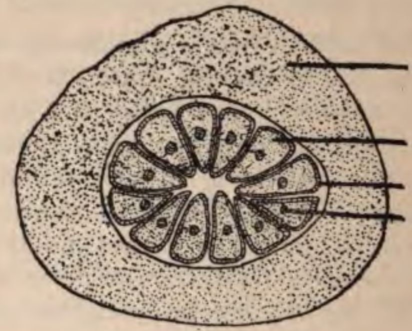
Space does not allow of further quotations from this very helpful book, which all hygienists should possess. As Dr. Walker Hall states, "the experiments have shown the importance of diet in its relation to uric acid."

A brief study only of these tables must convince everyone that the use of foods containing purin bodies must be prejudicial to health. I do not know what Dr. Haig's opinion on these findings of the physiological chemist is, but it is gratifying to those who value the magnificent work he has done. I have frequently met medical men who have said when Dr. Haig's name was mentioned, "Oh, he has uric-acid on the brain; his theory is all nonsense." When I have quietly asked, "Have you read Dr. Haig's book?" the answer has invariably been, no. Of what use, then, is such criticism. I have met many medical men who have read "Uric Acid," and have a profound admiration for the work. Dr. Haig may be over enthusiastic in ascribing so many diseases to uric acid, but he cannot overlook what to him are solid facts.

If physiological chemistry is demonstrating that many commonly used foods contain hurtful substances or poisons, and if this chemistry demonstrates further that not more than half of these poisons are changed inside the body, what is to become of the remainder? Dr. Haig and others have shown that they hide in the tissues and become a danger to health. So long ago as 1884, experiments were made at the Agricultural School at Grignon, with oats, and they were found to contain a substance easily soluble in alcohol, which produced an irritant action on the motor cells of the nervous system. It was described as a nitrogenous substance apparently of an alkaloidal character, uncrystallisable, granular, and of a brown colour. Its composition is given as $C^{16} H^{21} NO^{18}$, and was called avenin. This explains why oatmeal in some cases causes irritation and pimples. It is a sign, I suppose, of inability of the body to deal with the purin bodies contained in oats. Dr. Walker Hall has shown that some can apparently metabolize more of the purin bodies than others. The pulse foods, to the regret of many, are ruled out when the dietary needs to be free from purins. The Digestive Food Co., Paisley, claim, according to the report of their analyst, to supply prepared pulse foods free from these harmful substances. Though dietaries which contain flesh foods are supplied in this book, the author is unable to recommend them.

ABOUT DRINKS.

What to drink when tea, coffee and cocoa are ruled out is a problem to many who have become tied to these commonly-used beverages. When the body is well nourished there is much less demand for stimusiderable amount of proteid. The fat is not shown. For the use of this illustration I am indebted to Messrs. Flatters & Garnett, Microscopists, Deansgate, Manchester.



Dietaries Nos. 1 to 15 (except No. 4) are *uric acid free.* The food tables and analyses in this book differ from those given in "Science in the Daily Meal." They are from recent and more reliable investigations. A new edition of "Science in the Daily Meal" will agree with those supplied herein.

DIETARY STANDARDS

If the value or reliability of the standards is doubted, it should be remembered that an egg and milk provided the examples for the earlier investigations of physiologists, and were a guide to human needs; later investigation has not disproved the wisdom of this adaptation.

I have only known one man who tried to live on one meal a day for a lengthened period, and he very soon broke down in health. All students of physiology must be inclined to question Dr Dewey's conclusions, they are entirely at variance with the teaching of the most eminent physiologists in Britain, America and Europe. Among a number of plausible and unscientific statements, Dr. Dewey states "that the body is maintained by rest and sleep alone;" this is not correct. Every time a muscle contracts some of its tissue is wasted and is at once rebuilt; the same applies to other parts of the body. Experiments made by Mosso, an Italian investigator, by Dr. Langemeyer, of Amsterdam; by Dr. Schumberg for the Prussian War Office, with an instrument called the ergograph, all showed that muscles were less fatigued when certain foods were administered.

It is quite easy to agree with Dr. Dewey's statement that sick people who have no hunger should be kept without food until hunger returns. But there is nothing new in that treatment. It may be commonly observed that dumb animals invariably refuse food when sick. One of the injunctions of the distinguished physician, Abernethy, was, "Stop the supplies and the enemy will leave the citadel." A Scotch physician of less distinction, Dr. Keith, author of "Fads of an Old Physician," was dubbed the "starving doctor," because he insisted on ridding disease from the bodies of his patients by withholding food. But why this deprivation should be carried on when appetite has returned it is difficult to imagine. If a man is hungry he is hungry, and no foolish distinctions between mouth hunger and stomach hunger will convince him of the contrary. Another argument for no breakfast is, that the stomach needs a rest. Why? we are compelled to ask again; why the stomach more than any other organ? why not the heart, for instance? why do not animals rest their stomachs? Some stomach digestion experiments have been made recently by Pengoldt, in Germany, on healthy men. This investigator found that 6 to 7 ounces of water left the stomach in 1½ hours, 7 ounces of boiled milk 2 hours, hot drinks no sooner than cold ones; two eggs, raw, poached or as an omelette, 7 ounces sweetbreads, 10 oysters, 7 ounces white fish, 3½ ounces white bread, cauliflower or cherries, all left the stomach in 2 to 3 hours; 8¼ ounces chicken, 9 ounces lean beef, 6 ounces boiled ham, 3½ ounces roast veal or beefsteak, 5⅓ ounces coarse bread, boiled rice, carrots, spinach, radish, or apple left the stomach in 3 to 4 hours; 9 ounces smoked tongue, 3½ ounces smoked beef, 9 ounces roast goose, 5½ ounces string beans, 7 ounces peas porridge, left the stomach in 4 to 5 hours.

We see from these experiments that the quantity eaten increases the length of time the food remains in the stomach. We may, therefore, ask what is gained by stuffing the stomach by two big meals a day? There is absolutely no gain, physiologically, because we see that large quantities demand more time, therefore more energy and power to digest them.

In 1884 experiments were made by Smirnov, in St. Petersburg; the subjects were 8 healthy young men. The experiments were carried on over a period of 12 days—six days three meals a day, and six days five meals a day. It was found that the assimilation of food increased 2·39 per cent, the quantitative metabolism decreased on an average 8·37 per cent, and judging by the amount of extractives in the urine the qualitative metabolism increased on an average 1·54 per cent. The subjects gained in weight.

The writer's experience may be interesting here. For many years now his life has been hard and strenuous. Up to about the 26th birthday he had never suffered from a bilious attack, so-called. About this time he took a position in a business house where food was provided. As he disliked flesh, his diet was largely make-shift—white bread, potatoes, a little butter. Three of the day's meals were of this character. At this place he first suffered from biliousness, and for nearly ten years has continued to suffer in this way at intervals. He suffered so much eventually that his friends said he had cancer of the stomach. Every one or two weeks these attacks would return. Some months ago he added a fourth meal to the three he was already taking; this fourth meal consisted of not more than four or five ounces bread and butter and a simple beverage, eaten immediately before retiring, or half an hour or more previous. The following striking facts were noted: a sweeter taste in the mouth in a morning, dandruff which he had has vanished, an irritability of the scalp has also vanished. The attacks have only returned twice in six months' time, and the last attack caused scarcely any inconvenience. He is convinced now that his sickness was not the result of biliousness, but caused by nervous exhaustion and want of sufficient food. Like many another, he cannot supply the physiological demands at two meals; he cannot eat enough.

This book has been written in less than one month's spare time. Almost the whole of it has had to be written between the hours of 11 p.m. and 2 a.m. The reason for this being that it was promised by a certain date. The writer makes this personal reference to show that hard intellectual work can be done on three or four meals, even when preceded by a hard day's work of 15 hours. The practice of working so long is not of course recommended.

Dr. Dewey, in the letter referred to, states that "I have not the least doubt that one general meal a day is ample for the maintenance of the normal weight, in all ordinary manual labour."

Mr. Hugh Mapleton, four years ago was in charge of a colony near Sheffield; five of the members of the colony took up the two-meal plan, and tried it for two months; they were compelled to give it up and to return to three meals, being positively unable to work at digging and outdoor labour, owing to experiencing intense hunger; they lost weight also, though they ate abundance of food.

Professor Atwater, who writes with so much sanity and clearness on dietetic matters, states that "the theory is advanced from time to time that one or two meals a day are preferable to the three commonly served in this country. If the same amount of food is to be eaten, it is hard to see the advantage of two hearty meals over three ordinary ones. The best physiological evidence implies that moderate quantities of food taken at moderate intervals are more easily and completely digested by ordinary people than larger quantities at longer intervals.

"If the food ordinarily taken is considered excessive and the aim is simply to reduce the amount, it would seem more rational to make all the meals lighter than to leave out one. The very fact that the custom of eating a number of meals a day has so long been universal, indicates that it must have some advantages which instinct, based upon experience, approves and justifies."

Finally, my opinion on this matter is that man can live and be well on two meals, but he will do better on three or even four, if he exercises judgment and self-control. He cannot go wrong if he arranges his food by one of the standards supplied. It is possible to exist on two, perhaps one meal a day, just as a man can exist without a leg, or other limb of his body; he exists without it, but he is vastly better with it. Or to use another illustration, it is like piling a whole day's coal supply on the fire and expecting it to burn cheerfully and freely. We know it will do no such thing. Neither will the human furnace burn well, treated in a similar way.

ON BECOMING STRONG.

None can become strong except by the adoption of a pure and properly balanced dietary and by exercise of muscles and tissues—there is no other way. As muscles are exercised an increased flow of blood is supplied, and they thus become stronger. Stuffing, too large and too frequent meals do not produce strength—they reduce it.

I would strongly urge all who have harmed their physique by early or other indiscretions to forget the past; such should remember that "the present only avails." All such should arrange their lives in harmony with the known laws of health and hygiene and they will soon become stronger than before.

ABOUT NUTS AS FOOD.

The food value of nuts is considerable, as a reference to the food tables will show. Most kinds are very rich in proteid, and richer still in fat; pine kernels, for instance, have 152 grains proteid in every ounce, and 178 calories of energy; peanuts, 113 and 160 calories; almonds, 95 and 189 calories of energy. Beef sirloin has 72 grains proteid and 83 calories of energy per ounce. Nuts are considered to be very indigestible, but they are easily digested if eaten at the proper time—that is at meals.

It is the habit of many to eat nuts whenever fancy dictates, usually between meals or after a heavy dinner.

If eaten with bread, toast, or hard biscuit, and thoroughly masticated, they will not disagree. Those who have poor teeth should use a nut grater, to be had at most ironmongers. Experiments made recently, at the "Californian Agriculture Experiment Station," with six persons using nuts and fruit largely, showed that the nuts were quite thoroughly digested. The following illustration of a microscopic section of a pine kernel gives a good idea of the richness of this nut, the marked lines indicate the presence of a con-

Professor Atwater's analysis.			Albert Broadbent's food-table.		
	Proteid per cent.	Calories in one lb.	Grains Proteid in one oz.	Grams Proteid in one oz.	Calories in one oz.
Shank, fore, lean ...	22·0	665	100	6¼	42
,, med'm fat	20·4	870	90	5½	54
Shank, hind,					
very lean.	26·6	565	116	7¼	35
,, lean ...	21·9	635	95	5¾	40
,, med'm fat	20·9	875	90	5½	55
Shoulder & Clod					
very lean...	21·3	450	95	5¾	28
Shoulder & Clod					
lean...	20·4	605	90	5½	38
Shoulder & Clod					
medium fat...	19·6	840	86	5¼	52½
Forequarter,					
very lean...	22·1	565	100	6¼	35
,, lean... ...	18·9	865	82	5	54
,, med'm fat .	17·9	1235	77	4¾	77
Hindquarter,					
very lean...	24·0	595	108	6¾	37
,, lean... ...	20·0	935	90	5½	58
,, med'm fat .	18·3	1250	82	5	78
Sides, very lean ...	23·0	575	104	6½	36
,, lean	19·3	915	86	5¼	57
,, medium fat...	18·1	1265	82	5	79
Miscellaneous.					
Cuts, lean, no fat	22·4	540	100	6¼	34
Heart	15·7	920	68	4¼	57½
Beef Liver	18·1	520	82	5	32½
Lungs	16·4	440	72	4½	27½
Marrow	2·2	3955	9	½	247
Sweetbreads... ...	16·8	825	72	4½	52

Professor Atwater's analysis.			Albert Broadbent's food-table.		
	Proteid per cent.	Calories in one lb.	Grains Proteid in one oz.	Grams Proteid in one oz.	Calories in one oz.
Suet	4·7	3540	18	1	221½
Tongue	18·9	740	82	5	46
BEEF–CANNED					
Corned Beef ...	26·3	1280	116	7¼	80
Dried Beef	39·2	960	164	10¼	60
Tongue (whole) ...	19·5	1340	86	5¼	84
Tripe	16·8	670	72	4½	42
VEAL–FRESH					
Breast, lean	21·7	640	95	5¾	40
,, medium fat...	19·5	955	86	5¼	60
Chuck, lean	20·6	465	90	5½	29
,, medium fat...	19·7	640	86	5¾	40
Flank, medium fat..	19·4	690	86	5¾	43
,, fat	18·1	1355	82	5	85
Leg, lean	21·3	570	95	5¾	36
,, medium fat ...	20·2	755	90	5½	47
Leg Cutlets	20·3	705	90	5½	43
Loin, lean	20·4	615	90	5½	38
,, medium fat ...	19·9	825	86	5¼	52
Neck	20·3	670	90	5½	42
Rib, medium fat ...	20·7	640	90	5½	40
,, fat...	18·7	1160	82	5	72½
Rump	19·8	1050	86	5¼	66
Shank, fore	20·7	605	90	5½	38
,, hind, med'm fat	20·7	580	90	5½	36
Forequarter	20·0	710	90	5½	44
Hindquarter... ...	20·7	735	90	5½	46
Side (with kidney and fat)...	20·2	715	90	5½	45
Heart	16·8	720	72	4½	45

Professor Atwater's analysis.			Albert Broadbent's food-table.		
	Proteid per cent.	Calories in one lb.	Grains Proteid in one oz.	Grams Proteid in one oz.	Calories in one oz.
Kidneys	16·9	585	72	4½	37
Liver	19·0	575	86	5¼	36
LAMB–FRESH					
Breast or Chuck ...	19·1	1350	86	5¼	84
Leg, hind, med'm fat	19·2	1055	86	5¼	66
„ fat ...	18·3	1495	82	5	93
Loin	18·7	1540	82	5	96
Neck	17·7	1375	77	4¾	86
Leg, free from fat ..	25·3	585	113	7	37
Shoulder	18·1	1590	82	5	99
Forequarter	18·3	1430	82	5	89
Hindquarter... ...	19·6	1170	86	5¼	73
Side	17·6	1300	77	4¾	81
MUTTON–FRESH					
Chuck, lean	17·8	1020	77	4¾	64
„ medium fat...	15·1	1700	68	4¼	106
„ fat	13·9	2155	58	3½	135
Flank, medium fat.	15·2	1900	68	4¼	119
Leg, hind, lean ...	19·8	890	86	5¼	56
„ med'm fat	18·5	1105	82	5	69
„ fat... ...	17·3	1465	77	4¾	92
Loin, medium fat, without kidney...	16·0	1695	72	4½	106
Loin, without kidney, fat...	14·7	2035	64	4	127
Neck, medium fat..	16·9	1355	72	4½	85
„ very fat ...	13·9	2095	58	3½	131
Shoulder, lean ...	19·5	905	86	5¼	57
„ medium fat...	17·7	1170	77	4¾	73
Forequarter	15·6	1595	68	4¼	100

Professor Atwater's analysis.			Albert Broadbent's food-table.		
	Proteid per cent	Calories in one lb.	Grains Proteid in one oz.	Grams Proteid in one oz.	Calories in one oz.
MUTTON—*continued.*					
Hindquarter... ...	16·7	1495	72	4½	93
Side, with tallow ...	16·3	1520	72	4½	95
,, without ,, ...	16·2	1560	72	4½	97½
Heart	16·9	845	72	4½	53
Kidneys	16·5	440	72	4½	27½
Liver	23·1	905	104	6½	57
Lungs	20·2	495	90	5½	31
Canned, corned ...	28·8	1500	128	8	94
,, Tongue ...	24·4	1465	104	6½	92
PORK					
Chuck Ribs and Shoulder...	17·3	1635	77	4¾	102
Flank	18·5	1280	82	5	74
Ham, fresh, lean ...	25·0	1075	113	7	67
,, med'm fat	15·3	1505	68	4¼	94
,, fat... ...	12·4	2345	54	3¼	147
Head	13·4	1990	58	3½	124
Loin (chops) lean...	20·3	1180	90	5½	74
,, med. fat	16·6	1580	72	4½	99
Loin, tenderloin ...	18·9	900	82	5	56
Middle cuts	15·7	1825	68	4¼	114
Shoulder	13·3	1690	58	3½	106
Side-fat included ...	9·4	2780	41	2½	174
Feet	15·8	1405	68	4¼	88
Trimmings	5·4	3060	22	1¼	191
Ham, smoked, lean	19·8	1245	86	5¼	78
,, medium fat	16·3	1940	72	4½	121
Pork, salted, lean ends...	8·4	2985	36	2¼	187
Bacon, smoked, lean	15·5	2085	68	4¼	130
,, medium fat	9·9	3030	41	2½	189

Professor Atwater's analysis.			Albert Broadbent's food-table.		
	Proteid per cent.	Calories in one lb.	Grains Proteid in one oz.	Grams Proteid in one oz.	Calories in one oz.
SAUSAGE					
Pork Sausage-meat.	17·4	1695	77	4¾	106
Frankfort	19·6	1170	86	5¼	73
Holsteiner	29·4	2220	132	8¼	139
Lyons, pure ham...	32·3	1750	144	9	109
POULTRY					
Chicken	21·5	505	95	5¾	32
Fowls	19·3	1045	86	5¼	65
Goose, Young ...	16·3	1830	72	4½	114
Turkey...	21·1	1360	95	5¾	85
FISH					
Cod	16·5	325	72	4½	20
Cod Steaks	18·7	370	82	5	23
Eels	18·6	730	82	5	46
Flounder	14·2	290	64	4	17
Haddock	17·2	335	77	4¾	21
Hake	15·4	315	68	4¼	20
Halibut	18·6	565	82	5	35
Herring	19·5	660	86	5¼	41
Mackerel	18·7	645	82	5	40
Perch	19·3	530	86	5¼	33
Pickerel	18·7	370	82	5	23
Pike, gray	17·9	365	77	4¾	23
Salmon...	22·0	950	100	6¼	59
Shad	18·8	750	82	5	47
Skate	18·2	400	82	5	25
Sturgeon	18·1	415	82	5	26
Trout	19·2	445	86	5¼	28
Turbot...	14·8	885	64	4	55
Whitefish	22·9	700	100	6¼	44
Haddock, smoked..	23·3	440	104	6½	27½
Halibut ,,	20·7	1020	90	5½	64
Herring ,,	36·0	1355	164	10¼	85

Professor Atwater's analysis.			Albert Broadbent's food-table.		
	Proteid per cent.	Calories in one lb.	Grains Proteid in one oz.	Grams Proteid in one oz.	Calories in one oz.
Salmon, canned ...	21·8	915	95	5¾	57
Sardines ,, ...	23·0	1260	104	6½	79
Frog's legs	15·5	295	68	4¼	18
Clams	8·6	240	36	2¼	15
Crabs	16·0	415	72	4½	26
Lobster	16·4	390	72	4½	24
Mussels	8·7	285	36	2¼	18
Oysters, edible part.	6·2	235	28	1¾	15
Shrimps	25·4	520	113	7	32½
EGGS—HEN'S					
Fresh	13·4	720	58	3½	45
Boiled	13·2	765	58	3½	48
,, whites ...	12·3	250	54	3¼	16
,, yolks	15·7	1705	68	4¼	107
Beef-juice	4·9	115	18	1	7
Sugar	—	1860	—	—	116
DAIRY PRODUCTS					
Milk, whole	3·3	325	13	¾	20
,, skimmed ...	3·4	170	13	¾	11
,, condensed ...	8·8	1520	36	2¼	95
Buttermilk	3·0	165	13	¾	10
CHEESE					
American, Pale ...	28·8	2055	128	8	128
Boudon	15·4	1195	68	4¼	75
Cheddar	27·7	2145	122	7½	134
Cheshire	26·9	1810	116	7¼	113
Dutch	37·1	1435	168	10½	90
Limburger	23·0	1675	104	6½	105
Neuchatel	18·7	1530	82	5	96
Roquefort	22·6	1700	100	6¼	106
Skimmed Milk ...	31·5	1320	140	8¾	82½
Swiss	27·6	2010	122	7½	126
Butter	1·0	3605	4	¼	225

Table of Composition of Mineral Constituents of Foods.

Taken from Dr. LAHMANN's "Natural Hygiene," being E. WOLFF's analysis.

	Potash	Soda	Lime	Magnesia	Oxide of iron	Phosphoric acid	Sulphuric acid	Silicic acid	Chlorine
Cow's milk	24.67	9·70	22·05	3·05	·55	28·45	·30	·04	14·28
Human milk......	33·79	9·12	16·69	2·16	·22	22·66	·95	·02	18·38
VEGETABLES AND LETTUCE									
Savoy	27·50	10·16	21·38	3·59	1·73	14·75	8·20	4·78	7·91
Cabbage	38·86	9·46	17·63	4·00	·69	8·99	13·91	·87	8·51
Spinach............	16·56	35·23	11·88	6·38	3·35	10·25	6·87	4·52	6·20
Cauliflower	44·36	5·89	5·58	3·66	1·02	20·22	13·01	3·76	3·44
Stinging-nettle *(vegetable and salad weeds)*	32·04	2·39	28·24	7·16	4·77	7·84	8·35	4·03	6·66
Dandelion.........	38·86	10·44	19·96	8·38	·86	7·84	2·24	7·01	2·65
Asparagus.........	24·04	17·08	10·85	4·32	3·38	18·57	6·18	10·09	5·93
Cucumber.........	41·16	10·04	7·30	4·15	1·40	20·00	6·92	8·03	6·59
Lettuce............	46·01	9·43	6·05	2·17	—	8·52	3·89	20·23	4·75
Cabbage-lettuce	37.63	7·54	14·68	6·19	5·21	9·19	3·76	8·14	7·65
Summer endive	25·30	35·30	11·86	4·33	1·26	10·90	3·87	2·99	4·19
Leek (porret) ...	30·72	14·15	10·37	2·92	7·61	16·69	7·35	7·36	3·11
Onion	34·03	2·48	22·87	4·65	2·27	17·35	5·68	8·50	2·41
Mushrooms	50·89	1·65	1·01	3·37	1·62	33·71	3·94	·98	·88
BULBOUS AND ROOT VEG'T'BL'S									
Radish	32·00	21·15	14·94	3·10	2·84	10·86	6·47	·91	9·15
Horse-radish ...	21·98	3·75	8·78	3·53	1·16	41·12	7·71	8·17	4·90
Celery (the stalk)	43·19	—	13·11	5·82	1·41	12·83	5·58	3·85	15·87
Potato	60·06	2·96	2·64	4·93	1·10	16·86	6·52	2·04	3·46
Topinambour ...	47·74	10·16	3·28	2·93	3·73	14·00	4·91	10·03	3·87
French turnip ...	46·93	5·65	11·33	3·68	·61	14·51	9·62	1·06	6·59
Carrot	36·92	21·17	11·34	4·38	1·01	12·79	6·45	2·38	4·59
Cabbage-turnip	35·31	6·54	10·97	6.84	3·03	21·90	8·85	2·48	4·95

	Pot-ash	Soda	Lime	Mag-nesia	Oxide of iron	Phos-phoric acid	Sul-phuric acid	Silicic acid	Chlor-ine
CEREALS AND PULSES									
Winter wheat ...	31·16	2.07	3·25	12.06	1·28	47·22	·39	1·96	·32
,, rye	32.10	1·47	2·94	11·22	1·24	47·74	1·28	1·37	·48
,, barley ...	16·33	4·14	·74	12·53	1·72	32·82	2·98	28·74	—
Oats	17·90	1·66	3·60	7·13	1·18	25·64	1·78	39·18	·94
Maize	29·78	1·10	2·17	15·52	·76	45·61	·78	2·09	·91
Rice	25·04	4·21	3·73	11·08	1·43	53·76	·50	2·59	·13
Millet	11·39	1·30	·63	9·63	1·08	21·92	·24	52·97	·49
Pea	43·10	·98	4·81	7·99	·83	35·90	3·42	·91	1·59
Lentil	34·76	13·50	6·34	2·47	2·00	36·30	—	—	4·63
Bean	41·48	1·06	4·99	7·15	·46	38·68	3·39	·65	1·78
NUTS, ETC.									
Walnut	31·11	2·25	8·59	13·03	1·32	43·70	—	—	—
Cocoa-nut (fresh)	43·88	8·39	4·63	9·44	—	16·99	5·09	.50	13·42
Cocoa-bean	55·89	2·26	5·44	11·06	·03	38·61	3·43	1·51	·85
FRUITS									
Apple	35·68	26·09	4·08	8·75	1·40	13·69	6·09	4·32	—
Pear	54·69	8·52	7·98	5·22	1·04	15·20	5·69	1·49	—
Cherry	51·85	2·19	7·47	5·46	1·98	15·97	5·09	9.04	1·35
Grape	56·20	1·42	10·77	4·21	·37	15·58	5·62	2·75	1·52
Plum	59·21	·54	10·04	5·46	3·20	15·10	3·83	2·36	—
Strawberry	21·07	28·48	14·21	—	5·89	13·82	3·15	12·05	1·69
Gooseberry	38·65	9·92	12·20	5·85	4·56	19·68	5·89	2·58	·75
ANIMAL PRODUCTS									
Flesh of animal	41·27	3·63	2·82	3·21	·70	42·54	1·56	1·11	3·85
,, fowl ...	30·90	18·70	3·25	4·15	—	36·40	—	—	8·05
,, sea-fish	21·80	14·90	15·20	3·90	—	34·50	—	—	11·40
Ox's blood	7·61	44·99	1·08	·60	9·38	5·25	3·05	·84	34·38
Pig's blood	23·29	29·43	1·30	1·40	8·86	12·15	1·03	—	28·52
Egg	17·37	22·87	10·91	1·14	·39	37·62	·32	·31	8·98
The white of egg	31·41	31·57	2·78	2·79	·57	4·41	2·12	1·06	28·82
The yolk ,,	9·29	5·87	13·04	2·13	1·65	65·46	—	·86	1·85
Holstein cheese . without com. salt	13·26	1·40	35·43	2·38	·80	38·37	·17	—	7·44
Gruyère cheese with com. salt	2·46	33·01	17·82	·81	·17	20·45	—		·08	33·61

			Albert Broadbent's Table.		
	Proteid per cent.	Calories in one lb.	Grains Proteid in one oz.	Grams Proteid in one oz.	Calories in one oz.
Hovis Flour	16·84	1650	72	4½	103
,, Bread	11·13	1080	50	3	68
Digestive Pea Flour	26·41	1670	116	7¼	105
,, Lentil ,,	28·22	1400	128	8	87½
Grape Nuts	15·0	1700	68	4¼	106
"Force"	12·0	1700	54	3¼	106
Cadbury's Cocoa ...	—	—	151	9½	81
"Wheatose"	12·0	1600	54	3¼	100

Shredded Wheat, see page 106.

The difference between Hovis Flour and Bread, Digestive Pea and Lentil Flour, in calorie value, is due to the presence of more or less moisture.

NOTES.

I am glad to be able to announce that an establishment has been opened at Slough, near Windsor, for the treatment of uric acid diseases by uric-acid-free diet. It is not primarily a financial undertaking. The appointments are artistic, and the management and cookery are very good. A specialist for uric acid disease visits twice weekly. For particulars apply the Secretary, Apsley House, Slough.

EGGS are included in a number of the dietaries in this book. They should be absolutely fresh. Tainted eggs are of course hurtful.

METABOLISM.—The manifold changes that take place in food in the body, and also the breaking down and rebuilding of tissues are covered by this term.

BARILLA SOAP (page 76).—The manufacturers of this article state that they do not wish their soap called by this name, as soap made with caustic soda is often stamped "Barilla." Brown's McLinton's soap is guaranteed to be made from plant ashes.

The books and most of the foods referred to herein can be supplied by the Health Food Stores, 19, Oxford Road, Manchester.

The author hopes it will not be inferred that he has recommended any foods because of *pecuniary* interest therein.

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